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Literature Review: Self-criticism, Self-compassion and Attachment: A Systematic Review

Major Research Project: Self-Compassion and Attachment Priming: Does Security Priming Aid Self-Compassion in Self-Critical Individuals?

Submitted by Amaryllis Roy, to the University of Exeter as a thesis for the degree of Doctor of Clinical Psychology, May 2015.

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LITERATURE REVIEW

Self-criticism, Self-compassion and Attachment: A Systematic Review

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Declaration: I certify that all material in this literature review which is not my own work has been identified and properly attributed. I have conducted the work in line with the BPS DCP Professional Practice Guidelines.

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Self-criticism, Self-compassion and Attachment: A Systematic Review

Abstract

Relationship with the self and the role in this of attachment experiences is increasingly recognised as a potentially important element in successful psychotherapy. The current systematic review aimed to evaluate evidence on interventions specifically targeting self-compassion and dysfunctional self-criticism, and to examine what is known about the relationship between attachment, self-criticism and self-compassion. Relevant studies were sourced using a systematic search of databases using search terms in three categories relating to interventions, outcomes and study design. Abstracts of all articles identified were then reviewed against pre-determined exclusion/inclusion criteria, and finally full texts were then screened against these criteria to obtain a final list for review. Twenty-one relevant studies were identified. Data relating to participants, interventions, comparisons, outcome measures, study design, study quality and findings were extracted and synthesised. Self-compassion training was the most frequently used intervention but there was not enough evidence to conclude that it is effective with clinical populations. Studies on attachment, self-criticism and self-compassion indicated consistent associations between insecure attachment styles and low self-compassion/high self-criticism. Limitations of the studies and the review were outlined. Recommendations for future research included exploration of the potential benefits of “security priming” in relation to self-criticism and self-compassion, including physiological measures as well as self-report, and comparison of different aspects of self-compassion induction.

Self-criticism, Self-compassion and Attachment: A Systematic Review

Background

In recent years empirical research and clinical practice have identified that individuals who are highly self-critical and find it difficult to treat themselves with kindness are more vulnerable to psychopathology and tend to benefit less from psychotherapeutic interventions (Gilbert, 2009, Kannan & Levitt, 2013). As a result, there has been a high level of interest in the development of interventions which can alleviate punitive self-criticism and enhance self-compassion, such as Compassion Focused Therapy (Gilbert, 2009).

Self-compassion is defined by Neff (2003) as comprising three elements: an attitude of kindness towards the self in instances of pain or failure, a perception of suffering as part of the common human condition rather than as unique and isolating, and the ability to hold unpleasant internal experiences in awareness without either pushing them away or becoming overwhelmed by them. A number of authors (Neff & McGehee, 2009, Raque-Bogdan, Ericson, Jackson, Martian & Bryan, 2011, Irons, Gilbert, Baldwin, Baccus & Palmer, 2006) have speculated that self-compassion and self-criticism can be viewed as internalisations of the parent-child relationship, or, in other words, as deriving from early attachment experiences. Attachment is defined as a behavioural system regulating proximity-seeking behaviour to caregivers in infancy (Mikulincer & Shaver, 2007). Where caregivers have responded adequately to an infant's bids for proximity, so-called "attachment security" will result, which gives rise to generally positive expectations of relationships. Attachment security in infancy is seen as stimulating the "affiliative" or social safety/soothing brain system (Gilbert, 2009), which can then be self-activated in adulthood.

Interestingly, however, a large body of empirical work has shown that stimulating the postulated “affiliative” system through “security priming” (stimulating thoughts of others with whom individuals have a close supportive relationship), can at least temporarily increase a range of pro-social and self-supportive behaviours and dispositions, regardless of long-term attachment style (Mikulincer & Shaver, 2005, Gillath, Selcuk & Shaver, 2008).

The purpose of this review is therefore twofold. Firstly, it seeks to evaluate current evidence on interventions designed to enhance self-compassion and/or reduce dysfunctional self-criticism. Secondly, it attempts to determine the extent of current knowledge regarding the relationship/s between attachment, self-criticism, and self-compassion.

Review questions.

1. Is there evidence for the effectiveness of psychological interventions in enhancing self-compassion and /or reducing self-criticism?
2. Is there evidence of associations between self-criticism, self-compassion and attachment and if so what is the nature of these?

Method

A systematic literature search was carried out in three stages; firstly, a wide initial search for all potentially relevant studies, secondly, a review of abstracts against pre-determined inclusion/exclusion criteria, and thirdly, reading through full articles and screening with the inclusion/exclusion criteria to obtain a final list for review.

Following initial scoping reviews, search terms were formulated in three categories, which were combined for the search. The first related to interventions and included synonyms for both attachment priming interventions and compassion-focused interventions. The second related to outcomes and included synonyms for self-compassion, self-criticism and attachment security. The third related to design and included terms for both experimental and correlational research. The search was carried out on the databases PsychINFO, PubMed, Web of Science and PsychARTICLES, on all published articles on record up to the search date (week 3, August 2014). Reference lists and key authors/journals were also hand-searched.

Inclusion/exclusion criteria applied were as follows: 1) Studies should relate to adults (over 18), populations with severe physical problems in addition to mental health difficulties or with dual diagnosis were excluded (e.g. head injury, palliative care, eating disorders, addictions). Forensic populations were also excluded due to the potentially complicating factor of social judgement in addition to self-judgement. 2) Studies included must relate to self-compassion or self-criticism, either in the capacity of assessing an intervention to manipulate these variables, or discussing these in relation to attachment. Studies which merely reviewed evidence for the benefits of self-compassion or for self-criticism/absence of self-compassion as a vulnerability factor were excluded, as were studies relating to compassion for others, including compassion fatigue, compassion satisfaction, empathy and altruism. 3) Included studies must contain quantitative data; purely qualitative studies, case studies, and theoretical articles were excluded. No minimum standard was set for the quantitative data due to the newness of this area and the unlikelihood of the existence of many high-quality controlled trials.

Initial screening resulted in a total of 53 articles for full text review (see Figure 1). A further 32 were excluded as a full reading indicated that they did not meet criteria (see Table 1 for reasons for exclusion). This resulted in a final total of 21 articles for review.

Search conducted on key databases: PsychINFO, PubMed, Web of Science, PsychARTICLES

Search terms in three categories, combined for the search:

1. Security priming OR secure base priming OR affective priming OR safe base priming OR self-reassurance OR self-soothing OR compassionate imagery OR loving-kindness
2. Compassion OR self-compassion OR fear of compassion OR self-criticism OR self-attack OR shame OR social safety OR attachment security OR secure attachment
3. Experiment OR control OR condition OR correlation OR regression

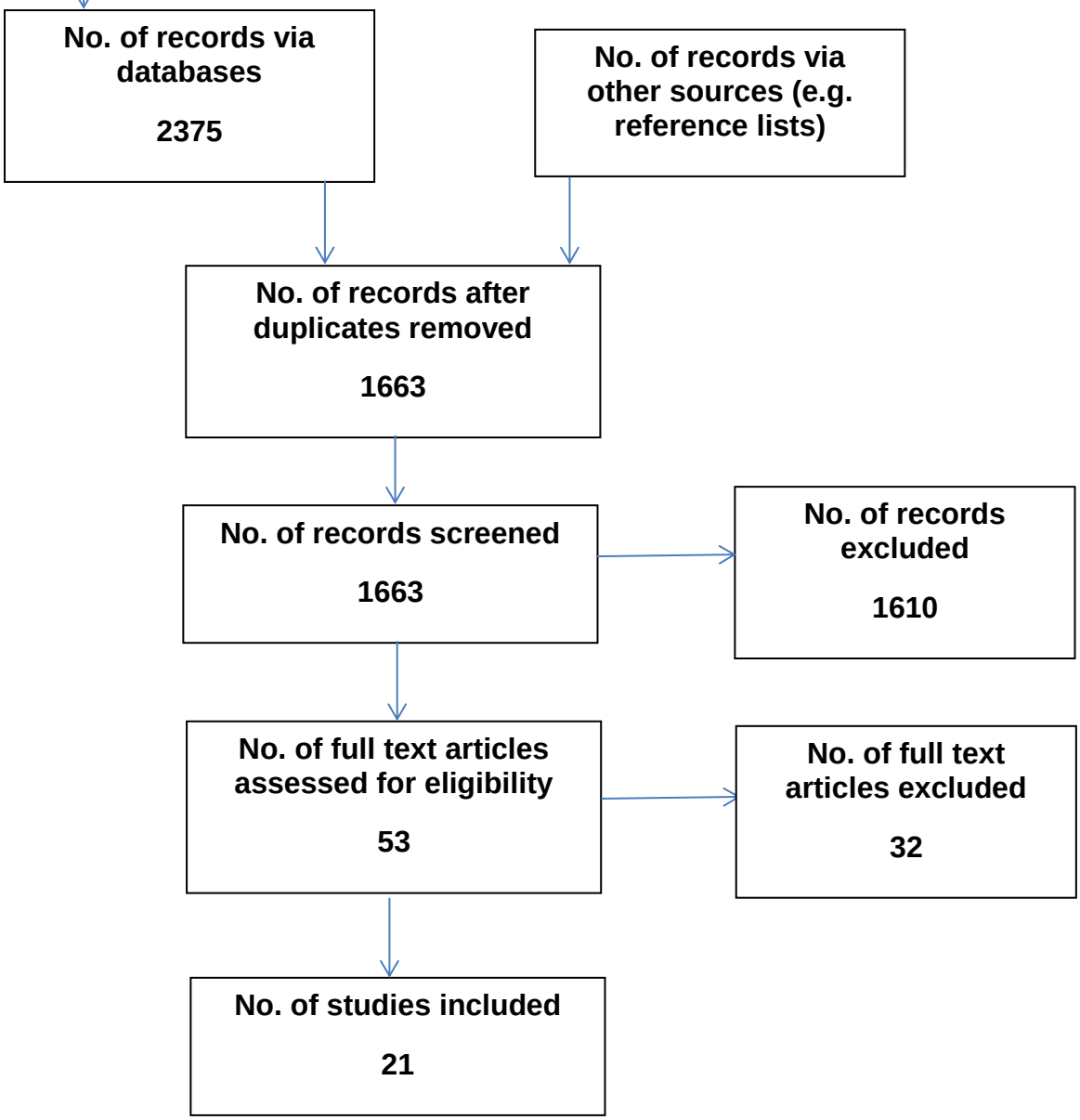

Figure 1. Inclusion Flowchart.

Table 1.

Reasons for Exclusion at Second Stage

Number of articles	Reason for exclusion
1	Single case study only
1	Theoretical article only
2	Mindfulness rather than self-compassion
1	Compassion for others not self-compassion
1	Subtypes of self-criticism
1	Qualitative data only
10	Aspects of attachment not related to self-criticism or self-compassion
14	Benefits of self-compassion to wellbeing outcomes OR disbenefits of self-criticism
1	Attachment and regret not self-criticism
Total 32	

Summary of Studies

The studies included were all conducted over a ten-year period from 2004 to 2014. The majority (14/21) were conducted in the United States or United Kingdom, with the remainder conducted in Canada or Europe except for two conducted in Israel. Thirteen of the final 21 articles concerned interventions to enhance self-compassion and/or diminish self-criticism, in both therapeutic and experimental contexts. Eight related to links between attachment, self-compassion and/or self-criticism. These two categories will now be addressed in turn.

Interventions for self-criticism/self-compassion.

Participants.

Diagnostic status. Of the 13 studies in this category, seven used non-clinical samples (undergraduates or community). Of those studies which used clinical populations, two had participants with diagnoses of personality disorder, one study had participants with “severe and enduring” mental health diagnoses, one had patients with a primary diagnosis of schizophrenia or bipolar disorder, and two had patients primarily suffering with depression.

Ethnicity. Of those studies which reported ethnicity, most had majority White participants except for one study which reported majority Asian-Americans.

Age. Of those studies which reported age, five had participant mean age in the 40s, three with mean age in the 20s, two with mean age in the 30s and one with mean age of 50.

Gender. Most of the studies reported that female participants were a majority, except for one study which had a slight male majority in the treatment group.

Interventions.

Type of interventions. Over half of the studies in this category (seven in total) used some form of compassion training as an intervention. Other interventions included dynamic therapy, cognitive therapy, emotion focused therapy, expressive writing, computer self-help exercises, and support-giving exercises. Five of the thirteen studies used individually-based interventions, and eight used group formats.

Duration of interventions. Interventions ranged in duration from 40 sessions to "one-off" interventions. About half (six studies in total) ranged between eight to twelve weeks, with two at 16 weeks.

Controls. Five studies used waitlist controls, one used an active treatment control, one used "treatment as usual" and two used experimental controls. Four had no control condition.

Outcomes. Almost all the studies used self-report measures of self-compassion, self-criticism and a range of other psychiatric symptom and wellbeing measures. Three studies also used coding of participant written reports or verbal material to assess for indications of increased self-compassion.

Attachment, self-compassion and self-criticism studies.

Participants.

Diagnostic status. Participants were non-clinical in all but one study, which used depressed outpatients.

Ethnicity. Only four out of the eight studies in this category reported ethnicity, of these, all had majority White participants.

Age. Of those studies which reported age, five used participants with mean age in the 20s, and one had participants with a mean age of 48.

Gender. Of those studies which reported the gender balance, three had majority female participants, one had majority male, and two had approximate parity.

Type of study. Most of the studies in this category used cross-sectional correlational designs looking at data from self-report measures. Two looked at

responses to compassion-focused imagery, as assessed by self-report or physiological measures, and correlated this with attachment style.

(For tables summarising all the studies reviewed, see following pages, and see Appendix A for key to studies).

Table 2. *Summary of Studies (Interventions for Self-Criticism/Self-Compassion)*

Article	Design	Setting	Participants	Interventions	Therapists	Comparisons	Outcomes measured
1 Schanche et al., 2011	Pre-test post-test group design	Outpatients, Norway	N=50, 50% female, mean age mid-30s, met criteria for diagnosis of Cluster C personality disorder.	40 sessions short-term dynamic psychotherapy (STDP) or cognitive therapy (CT)	Psychiatrists or clinical psychologists with average 10 years' clinical experience.	STDP vs CT. No waitlist control group.	Levels of defence recognition, activating affect, inhibitory affect, self-compassion as measured by Achievement of Therapeutic Objectives Scale (ATOS), psychiatric symptoms.
2 Neff & Germer, 2011	RCT	Community, US	N=51, mean age 50, majority white female, non-clinical sample.	8 weeks Mindful Self-Compassion (MSC)	Clinical psychologists.	Waitlist control.	Self-compassion, mindfulness, happiness, connectedness, life satisfaction, compassion, avoidance, anxiety, stress, depression.
3 Jazaieri et al., 2014	RCT	Community, US	N=100, mean age 42, majority white female, non-clinical sample	9 weeks CCT (compassion cultivation training)	PhD level psychologists with >10 years' experience of personal meditation and teaching meditation.	Waitlist control	Mindfulness, affect (happiness, worry, stress) and emotional regulation (use of emotional suppression and cognitive reappraisal).
4 Jazaieri et al., 2013	RCT	Community, US	N=100, mean age 42, majority white female, non-clinical sample	9 weeks CCT (compassion cultivation training)	PhD level psychologists with >10 years' experience of personal meditation and teaching meditation.	Waitlist control	Fear of compassion (Fear of Compassion Scale) and self-compassion (Self-Compassion Scale).
5 Gilbert & Proctor, 2006	Pre-test post-test group design	Mental health day centre, UK	N=6, 4 female, 2 male, severe and enduring mental health difficulties.	12 weeks CMT (Compassionate Mind Training)	Experienced therapists.	No control	Anxiety and depression, self-criticism, self-reassurance, shame, social comparison, submissive behaviour
6 Lucre & Corten, 2013	Pre-test post-test group design	Outpatient psychotherapy department, UK	N=8, white, majority female, age range 18-54, diagnosis of personality disorder.	16 weeks Compassion Focused Therapy (CFT) group.	Cognitive therapist and group facilitator.	No control.	Shame, self-criticism, self-reassurance, depression, stress, wellbeing.
7 Troop et al., 2012	Randomised controlled design	University, UK	N=46, mean age 25, majority female	Expressive writing about life goals, x3in one hour.	N/A	'Emotionally neutral' writing condition	Self-criticism, self-reassurance, stress, positive affect at baseline and at two-week follow-up.
8 Braehler et al., 2013	RCT	Outpatient, Scotland	N=40. All with primary diagnosis of schizophrenia-spectrum or bipolar	16 sessions group CFT	Psychologists experienced in psychological therapy for psychosis.	CFT+TAU vs TAU	Coding of Narrative Recovery Interview for levels of compassion vs avoidance, observer rating of symptoms and functioning, and self-report for mood.

Table 2. *Summary of Studies (Interventions for Self-Criticism/Self-Compassion) continued*

Article	Design	Setting	Participants	Interventions	Therapists	Comparisons	Outcomes measured
9 Shahar et al., 2012	Pre-post	Community	N=10, all female, mean age 46	8 sessions Emotion Focused Therapy (EFT) with two-chair dialogue work.	Four doctoral students in clinical psychology.	No control group	Self-criticism and self-reassurance (FSCRS), self-compassion (SCS), depression and anxiety (BDI, BAI
10 Shahar et al., 2014	RCT	Community, Israel	N=38, mean age approx. 30, selected for high-self-criticism.	7 x 90 minute sessions of loving-kindness mediation (LKM) group	Meditation teacher with 20 years' experience	Waitlist control	Self-criticism, self-reassurance, self-compassion, depression, anxiety, negative and positive affect
11 Gilbert & Irons, 2004	Pre-post (pilot)	Community, UK	N=9, members of depression self-help group self-selecting as highly self-critical, majority female	4 sessions of monitoring self-criticism and generating compassionate images	Clinical psychologists	No control	HADS depression scores, self-criticism, self-compassion
12 Kelly, Zuroff & Shapira, 2009	Pre-post	University, Canada	N=75 distressed acne sufferers mean age 22, majority female, 75% white	Computerised self-help intervention for either self-soothing or resisting self-attack	N/A	Control was two-week delay to intervention	Depression, shame and distress about acne (self-report).
13 Breines & Chen, 2013	Experimental	University, US	4 studies with undergraduates, samples sizes ranged from 34 to 90, mean age 20s, in all studies majority female and majority Asian-American particiapants.	Studies 1&2, thinking about giving support to a friend, Studies 3&4, giving support by writing suggestions.	N/A	Studies 1&2 control was thinking about having fun with a friend, Studies 3&4 hearing about problems but not being asked to give support.	State self-compassion in relation to recalled negative events or lab-based task failure.

Table 3. *Summary of Studies (Attachment and Self-Compassion/Self-Criticism)*

Article	Design	Setting	Participants	Interventions	Therapists	Comparisons	Outcomes measured
14 Neff & McGehee, 2010	Correlation, cross-section	US college	N=287 young adults, mean age 21, 68% white.	N/A	N/A	N/A	Self-compassion), depression, anxiety,, connectedness, maternal support, family functioning, attachment and 'personal fable' (sense of uniqueness)
15 Rockcliff et al., 2008	Within-subjects crossover	University, UK	N=22, age range 18-35	Compassion Focused Imagery	N/A	Control condition – imagery of favourite food	Heart rate variability (HR) and cortisol levels, also self-report measures of self-criticism, self-compassion, adult attachment, social safeness, depression, anxiety and stress.
16 Gilbert et al., 2014	Correlation, cross-section	Outpatient, UK	N=52, depressed outpatients, mean age 48, majority female	N/A	N/A	N/A	Fear of happiness, fear of compassion from others and for self, alexithymia, attachment, social safeness, depression, anxiety
17 Raque-Bogdan et al., 2011	Correlation, cross-section	University, US	N=208 students, mean age 20, majority white female	N/A	N/A	N/A	Attachment, self-compassion, 'mattering' (sense of significance to others), mental and physical health
18 Rockcliff et al., 2011	Double-blind RCT (within-subjects)	University, UK	N=41,, mean age 26, majority male	Compassion Focused Imagery	N/A	Oxytocin vs placebo	Positive and negative affect, 'resistance to compassionate emotions.'
19 Kelly et al., 2012	Correlation, cross-section	University, Canada	N=102, mean age 20, 75% white, 50% female	N/A	N/A	N/A	Self-criticism, attachment style, self-esteem, depression, Axis-II personality traits, social safeness, positive and negative affect, perceived and received social support.
20 Wei et al., 2011	Correlation, cross-section	University and community, US	195 college students (mean age 20, 95% white), 136 community adults (mean age 43, 83% white), 50% female	N/A	N/A	N/A	Attachment, self-compassion, empathy, subjective wellbeing
21 Irons et al, 2006	Correlation, cross-section	University, UK and Canada	197 undergraduates, majority female	N/A	N/A	N/A	Recall of parental styles, attachment, self-criticism, self-reassurance, depressive symptoms

Table 4. *Summary of Study Results (Interventions for Self-Criticism/Self-Compassion)*

Article	Statistics	Results	Authors' conclusions	Reviewer evaluation
1 Schanche et al., 2011	t-test, hierarchical regression	Mean increase in self-compassion score of 11.92 across whole group (SD = 19.75, d= .77). Increase in self-compassion associated with increase in activating and decrease in inhibitory affect, and with reduction in psychiatric symptoms	Self-compassion is enhanced by increasing activating affect and reducing inhibitory affect. Enhanced self-compassion improves functioning in Cluster C patients.	Small study on specific patient group, limited measurement points, no follow-up mentioned, construct validity of observer ratings of self-compassion and inadequate blinding of raters, cause-effect not fully established in association between affect expression and self-compassion.
2 Neff & Germer, 2011	t-test, ANOVA, hierarchical regression	Self-compassion mean increase 1.13 (SD= 0.6) in intervention group vs 0.18 in control (SD = 0.67), d = 1.67. Associated improvement in wellbeing measures, maintained at 6-month and 1-year follow-up	Mindful Self-Compassion enhances self-compassion, mindfulness and wellbeing.	Small non-clinical highly-educated predominantly white female sample mostly with prior meditation experience. No active control group.
3 Jazaieri et al., 2014	ANOVA	Increase in mindfulness and reported happiness, reduction in emotional suppression (M decrease of 6 in CCT group, F= 0.24), worry, no effect on stress or cognitive reappraisal	CCT supports flexible and adaptive psychological functioning	Evaluated purely by self-report. Lack of longer-term follow-up. No active comparison group. Non-clinical sample.
4 Jazaieri et al., 2013	ANOVA	Reduction in fear of compassion for others, from others and for self and increase in self-compassion. Mean fear of compassion for self in intervention group, pre = 13.24 (SD 11.18), post = 6.06 (SD= 7.37). Mean self-compassion in intervention group, pre = 2.85 (SD .82), post = 3.29 (SD .82).	Self-compassion training can increase self-compassion and reduces fear of compassion	Evaluated purely by self-report. Lack of longer-term follow-up. No active comparison group. Non-clinical sample.
5 Gilbert & Proctor, 2006	Wilcoxon signed rank	Reductions in anxiety, depression, self-criticism, shame, inferiority, submissiveness, increase in self-reassurance. FSCS Inadequate Self pre mean = 31.33 (SD 5.16) post = 14.5 (SD 7.01).	CMT may be a useful additional treatment for patients with chronic difficulties.	Uncontrolled study, very small numbers, patients were receiving other input from the standard day centre programme.
6 Lucre & Corten, 2013	Friedman's ANOVA	Reductions in shame, self-criticism, depression, stress, improvements in self-reassurance, wellbeing, functioning. Maintained at 1-year follow up.	CFT may be beneficial in treatment of patients with personality disorder	Small study, no control.

Table 4. *Summary of Study Results (Interventions for Self-Criticism/Self-Compassion continued)*

Article	Statistics	Results	Authors' conclusions	Reviewer evaluation
7 Troop et al., 2012	ANOVA	Decrease in self-criticism at follow-up for experimental group (baseline mean = 19.87 (SD=10.87), follow-up mean= 14.96 (SD= 10.9)	Expressive writing may decrease self-criticism	Small non-clinical sample, self-report measures only, need for further analysis of 'active ingredient' of the intervention e.g. writing about relationships?
8 Braehler et al., 2013	Wilcoxon Signed Rank, Mann Whitney U, Pearson correlation	Increase in compassion and reduction in avoidance on interview coding for CFT group, reduction in self-reported depression for CFT group which was associated with increase in compassion, greater observed clinical improvement for CFT group.	Group CFT may be an acceptable, feasible and effective intervention in recovery from psychosis.	Small numbers, TAU was highly variable both within and between groups, no formal checks on treatment fidelity, therapist competence and blinding of raters. No follow up. TAU group had higher levels of depression. Some participants struggled and felt group was too short.
9 Shahar et al., 2012	ANOVA, Friedman's tests	Significant improvements on most scales which were maintained at 6-month follow-up, except for 'hated self'' subscale of FSCRS (Forms of Self-Criticism and Reassurance Scale)	Emotion-focused two-chair work may be a promising intevention with self-critical clients.	Small sample size, no control group, lack of validated measures of adherence, no males in sample, reliance on self-report measures.
10 Shahar et al., 2014	ANOVA	Significant improvement in most areas (e.g. pre-treatment mean for FSCRS Inadequate self = 22 (SD=7.61) post = 16.9 (SD=7.5) FU mean = 14.35 (SD=7.9), maintained at 3-month follow-up.	LKM in a brief group format may alleviate self-criticism, increase self-compassion and improve depressive symptoms among self-critical individuals.	Small sample size, self-report measures, possible instructor effects (no adherence measures) and no decrease in 'hated self' on FSCRS.
11 Gilbert & Irons, 2004	t-tests	Non-significant reduction in mean self-criticism, significant increase in mean self-compassion (baseline = 15.57, SD= 9, post = 21.27, SD= 9.2).	Use of diaries and compassionate images may be useful in interventions for self-criticism.	Pilot study. Does not report which self-report measures were used. Very low numbers. No control group.
12 Kelly, Zuroff & Shapira, 2009	Multiple regression	Self-soothing intervention lowered shame and acne-related distress, but not depression. Resisting self-attack intervention lowered shame , acne-related distress and depression, and lowered depression more for high self-critics.	Computer-administered self-help exercises based on self-soothing and resisting self-attack may reduce distress in shame-prone individuals.	No details given of randomization procedures. Substantial number of participants did not have first language English but no details given of stratification procedures to control for this. Small, specific sample, reliance on self-report. Lack of follow-up.
13 Breines & Chen, 2013	ANOVA	State self-compassion was higher in the experimental than control condition across all four studies.	Activating support-giving schemas can increase ability to give support to oneself.	Unclear whether the effect on self-compassion could be longer-term. Use of self-report measures. However, addressed alternative explanations such as affect, self-esteem and awareness that other people have problems.

Table 5. *Summary of Study Results (Attachment and Self-Compassion/Self-Criticism)*

Article	Statistics	Results	Authors' conclusions	Reviewer evaluation
14 Neff & McGehee, 2010	Pearson correlation, regression analysis, Sobel test of mediation	Self-compassion was associated with well-being, was predicted by maternal support and family functioning, secure attachment positively associated with self-compassion, (.39 p<.05), insecure preoccupied negatively associated (-.23 p<.05), fearful attachment negatively associated (-.27 p<.05), insecure dismissive attachment not significantly linked to self-compassion (.05). Self-compassion was significant mediator of impact of attachment on wellbeing outcomes.	In some ways self-compassion can be viewed as an internal reflection of the parent-child relationship. However as effect sizes were modest to moderate, although attachment is involved in ability to give oneself compassion it does not determine how self-compassionate one is.	Largely white middle-class study with young people. Correlational design means that no conclusions about causality can be drawn. Small to medium effect sizes.
15 Rockcliff et al., 2008	ANOVA, Pearson correlation	Some individuals showed increase in HRV in response to compassion-focused imagery, others a decrease, those with increase in HRV also showed cortisol decrease. Correlational analysis showed that positive response to the CFI was associated with secure attachment (r=.52 p<.05) and social safeness (r=.57 p<.01) and negatively associated with self-criticism (r= -.54 p<.05) and anxious attachment (r=-.48 p<.05).	Self-compassion can stimulate a soothing affect system and attenuate hypothalamic-pituitary-adrenal axis activity in some individuals, but those who are more self-critical, with an insecure attachment style, may require therapeutic intervention to benefit from CFI.	Large effect sizes, but small numbers.
16 Gilbert et al., 2014	Pearson correlation, regression analysis	Fears of compassion and happiness were highly correlated with alexithymia, depression, anxiety and stress. Fears of compassion from others and for self were negatively correlated with secure attachment and positively correlated with anxious attachment. E.g. correlation between anxious attachment and fear of self-compassion .37 p<.05, correlation between secure attachment and fear of self compassion -0.35 p<.05.	Fears of positive emotions may lead to emotional avoidance and act as blocks to successful therapy.	Small sample, reliant on self-report measures, correlational design .
17 Raque-Bogdan et al., 2011	Pearson correlation, regression analysis	Insecure attachment was significantly negatively associated with self-compassion and mattering e.g. anxious attachment/self-compassion correlation = -.434 p<.05. Self-compassion and mattering both mediated the relationship between self-reported levels of insecure attachment and mental health.	Self-compassion may represent an internalization of the parent-child relationship. Attachment orientation impacts mental health through its effect on sense of significance to others and ability to be kind to self.	Largely white female demographics of sample, self-report measures, correlational research.

Table 5. *Summary of Study Results (Attachment and Self-Compassion/Self-Criticism continued)*

Article	Statistics	Results	Authors' conclusions	Reviewer evaluation
18 Rockcliff et al., 2011	ANOVA	Overall oxytocin enhanced ease and positive effect of CFI but less so for participants higher in self-criticism, lower in social safeness, self-reassurance and attachment security.	Effects of oxytocin on affiliation may depend on attachment and self-evaluative styles.	Some of the findings in relation to the differential impact of oxytocin were non-significant. Attempting to stimulate the attachment system may not always facilitate self-compassion.
19 Kelly et al., 2012	Pearson correlation, hierarchical regression	Self-criticism negatively correlated with social safeness (r=-.61 p=<.001), low social safeness strong predictor of trait self-criticism (β=-.74 p=<.001), even controlling for positive and negative affect and perceived social support. Low social safeness uniquely predicted depressive symptoms. Social safeness related to but distinct from perceived social support.	Social safeness is a distinctive affective experience which offers protection from psychosocial suffering.	Correlational research unable to clarify direction of effect between social safeness and self-criticism. Relied on self-report measures repeated daily over a week, participants may have developed a 'global response.' Demographic limitations.
20 Wei et al., 2011	Pearson correlation, factor analysis	Insecure attachment negatively correlated with self-compassion e.g. anxious attachment and self-compassion r=-.38 p=<.01 in both samples, avoidant attachment r=-.15 p=<.05 (student sample), avoidant attachment r=-.36 p=<.01 (community sample). Self-compassion was a significant mediator between insecure attachment and subjective wellbeing.	Lack of self-compassion mediates and helps to explain the negative association between attachment anxiety and subjective wellbeing.	Correlational study using self-report data so impossible to specify direction of effect e.g. they found that an alternative model would fit the data in which attachment insecurity mediated the association between self-compassion and wellbeing.
21 Irons et al, 2006	Pearson correlation, multivariate ANOVA	Individuals with fearful insecure attachment had significantly higher levels of self-criticism than secure attachment (e.g. M=19.44 SD=7.72 vs M=112.32 SD=6.77 p=<0.001) for 'inadequate self' self-criticism) whilst other forms of insecure attachment (preoccupied and dismissing) fell between the two. Secure attachment was negatively correlated with self-criticism (r=-.41 p=<.001) whilst fearful attachment was positively correlated with self-criticism (r=.40 p=<.001). Fearful attachment was negatively correlated with self-reassurance (r=-.36 p=<.001).	Impacts of negative parenting styles may translate into vulnerabilities to depression via development of self-to-self relating (i.e. self-criticism vs self-reassurance). Implications for potential value of developing self-reassurance and self-compassion as therapeutic interventions.	Correlational research, relying on self-report measures, demographics of sample skewed (predominantly female).

Critical Appraisal

Interventions for self-criticism/self-compassion. A number of the studies included are preliminary or pilot studies and as such suffer with a number of limitations. The majority of participants are White female and in some of the studies are likely to have been highly atypical e.g. having prior experience of meditation before taking part in the compassion intervention, although one strength of the studies as a whole is that they have been conducted across a range of clinical and non-clinical populations and with a range of ages. Many lack adequate controls and have very low sample sizes and lack adequate follow-up, even in larger studies there is evidence of a lack of proper randomization, stratification and rater blinding procedures and lack of clarity about attrition rates.

As a whole, the area suffers from a number of conceptual and definitional problems. For example, studies looking at “shame” (Study 12), “social safeness” (Study 15, 19) and “mattering” (Study 17) were included due to the considerable overlap between these concepts and the areas of interest (e.g. self-criticism, attachment security). Additionally, the most usually accepted definition of self-compassion is that outlined by Neff (2003) above, however, this includes three elements, and none of the studies attempting to enhance self-compassion elucidate the extent to which their intervention addresses each of these elements or the relative weighting which is given to each. There is therefore likely to be considerable variation between studies apparently using similar interventions, which makes it very difficult to determine the “active” elements of the interventions, for example, whether the “mindfulness” element on its own is more beneficial than directly encouraging compassion for the self, or whether

the emphasis on kindness for the self is as important as “global” compassion and vice versa, or whether these elements only work in combination, or are responded to differently by different individuals. It is also not clear which technical aspects of self-compassion training are most effective, e.g. meditation vs. imagery or writing exercises. There is also a lack of standardisation even within interventions, e.g. lack of monitoring of adherence to models or protocols, and a lack of attention to non-specific factors, in particular the relative importance of group-based treatment. This is significant due to the number of interventions which were delivered in group formats, which, in line with the definition of self-compassion, may be helpful in itself in encouraging a sense of common humanity and reducing a sense of unique suffering and isolation. The majority of studies rely exclusively on self-report measures, which given the high social desirability element of “compassion” may be problematic.

Qualitatively, two main themes emerge from the studies. One is a relational emphasis, which is common across all studies, whether through the group format or “common humanity” theme of compassion training, relating to a therapist in intensive individual therapy, activating relationship schemas by thinking about how to support others, or turning inner conflicts into dialogue. Even the expressive writing study which asked participants to write about “life goals” found that this tended to prompt participants to think about relationship goals, and that those who had positive expectations about these had greater decreases in self-criticism. A second aspect which may be important is that of self-expression, particularly emotional expression. This is perhaps most obvious in interventions such as the two-chair dialogue work and those with a focus on “activating affect” such as short-term dynamic psychotherapy, but there are also likely to be elements of this in most of the other interventions, whether explicitly

encouraged through written exercises (e.g. compassionate letter-writing) or as part of the implicit process.

The studies within this group divide into two main types of intervention. The majority explicitly teach self-compassion or self-soothing of some kind; but four studies (1, 7, 9 12) use interventions which facilitate self-expression. The results for both categories are mixed. Several of the self-compassion interventions have very small sample sizes (*N*=<10) and/or do not report effect sizes (5, 6, 11, 13). Studies 2, 4, 8 and 10 show large effect sizes (Cohen's *d* = .89 to 1.67) with sample sizes ranging from 38 to 100, but there were a number of design problems in each case (none of the studies had an active comparator control, and only one of the studies used a clinical sample (Study 8)). Only two of the studies used follow-up measures (2, 10) and only one reported on associated improvements in functioning (Study 2). Only one study (4) used treatment fidelity checks (adherence ratings) and only one used ratings other than self-report (Study 8) although rater blinding was not checked.

Of the interventions which primarily used self-expression, reported effect sizes ranged from medium to large (Cohen's *d* = .77 to 2.05) with sample sizes of 46-50. However, there are even more significant design problems with these studies. Study 1 used observer ratings to quantify self-compassion but failed to adequately blind raters, and although an association is found between enhanced emotional expression and self-compassion a causal relationship cannot be established, as self-compassion increased in both treatment groups including the one which did not specifically focus on "activating affect." Study 7 has a significant confound in that "expressive writing" in many cases appeared to consist largely of writing about relationships, which makes it impossible to

determine whether the observed decrease in self-criticism was due to self-expression as such or to some relational factor. Study 9 had a sample size of only 10, and Study 12 failed to adequately report effect sizes.

Attachment, self-compassion and self-criticism studies. The studies in this category are to some extent even more limited, as they mainly use non-clinical, predominantly young (early 20s) samples of primarily White ethnicity (often university undergraduates). The majority of the research is correlational, with attendant difficulties of specifying direction of effect or of ruling out other variables, particularly as the analyses are cross-sectional rather than longitudinal. There is an almost exclusive reliance on questionnaire data, thus mainly looking at self-reported global traits rather than behaviour and responses "in the moment." There is also a lack of consensus in the literature on classifications of insecure attachment, leading to some inconsistencies in findings. Effect sizes range from r = .15 to .61, with five (15,16, 17, 19, 21) reporting at least medium-sized effects, although these are not necessarily consistent across all variables.

The studies yield three main findings of note. The first is a consistent association between low self-compassion and/or high self-criticism with insecure attachment styles and a range of negative outcomes, including reduced subjective wellbeing (Study 20) and positive affect (Study 19), increased negative affect and poorer physical and mental health, usually increased anxiety, depression and stress (Studies 14, 16, 17). Secondly, some of the studies (14, 17, 20) have modelled a mediation relationship between these variables, proposing that low self-compassion and/or self-criticism is the mechanism by which chronic attachment insecurity exerts a negative influence

on psychological and physical health. These findings should be treated with caution, however, as in at least one of the studies (20) an alternative model whereby attachment (in)security is the mediating variable between self-compassion and wellbeing would fit the data equally well. Thirdly, two studies (15, 18) highlighted that individuals with insecure attachment styles and/or high self-criticism may be more likely to respond negatively to "affiliative" cues such as oxytocin or the invitation to self-soothe. However, Study 15 had a low sample size (*N* = 22) and the findings of Study 18 were somewhat equivocal in that although high self-critics administered oxytocin were more likely to respond negatively to compassionate imagery this was a "nonsignificant trend" (p = .59).

Discussion

On the evidence of these studies, it is not possible to draw any definitive conclusions about the most effective interventions for combating self-criticism or enhancing self-compassion as research is at too early a stage and of too low a quality. Teaching self-compassion is the most commonly-used intervention to date which explicitly targets self-criticism and low self-compassion. However due to the weaknesses of the study designs it is not possible to determine to what degree and which aspects confer any benefits, or whether broader factors such as stimulating emotional expression or reflection about relationships are most significant. Additionally not enough studies have been conducted with clinical samples to draw any firm conclusions about the effectiveness of these interventions in clinical populations, especially as most of the studies lack follow-up data and data on the impact of interventions on overall wellbeing and functioning.

There is some evidence from the literature of associations between insecure attachment, low self-compassion and elevated self-criticism and some tentative evidence that this may be part of the mechanism by which attachment insecurity tends to translate into poorer mental health outcomes (Studies 14, 17, 20) particularly if insecure and self-critical individuals may be more likely to have aversive responses to attempts to enlist “affiliative” responses (15, 18). However, this is again early stage research based primarily on non-clinical populations.

In relation to theory, the studies in general lend some support to the proposition that “affiliative” brain systems are protective, given the links demonstrated between attachment security and better health outcomes, and the evidence emerging from the intervention studies that relationships, whether actual or imagined, are an important “common factor” influencing treatment outcomes. Gilbert (2009) postulates three ‘affect regulation systems’ based on reward, threat, and contentment. In Gilbert’s model, the latter system is focused on ‘affiliative’ emotions and helps to regulate the other two. This is similar to the “social engagement” neural system outlined by Porges (2003) which inhibits the sympathetic nervous system and the dorsal vagal complex, (which are responsible for defensive behaviour such as “fight, flight or freeze” responses), and promotes a calm physiological state in which sympathetic and parasympathetic nervous systems are in balance, which is indicated by variability in heart rate (Rockcliff, Gilbert, McEwan, Lightman & Glover, 2008). Compromise of this system renders adaptive social behaviour difficult or impossible, and is observed in many forms of psychopathology (Porges, 2003).

The studies also give some support to the idea that intrapersonal processes mirror the interpersonal. Gilbert and Procter (2006) conceptualise self-criticism as the internalization of relationships characterised by threat and submission. Self-inhibition and self-attack become learned “safety behaviours”, originally intended to avoid attack from hostile, powerful others, but which have the unintended consequence of maintaining a sense of threat even in their absence, leading in the longer term to negative affect, arousal and physical and psychiatric symptoms. Additionally, in a hostile, unpredictable environment, entering a state of low arousal could be dangerous and affiliative signals from others cannot necessarily be relied upon, hence the development of a fear of affiliative emotion, originally self-protective but again having the long-term unintended consequence of hampering emotional regulation, leading to uncontrolled arousal and psychopathology (Gilbert, McEwan, Matos and Rivis, 2011). To self-soothe, therefore, people need a feeling of sufficient safety, otherwise they will actively resist attempts to develop self-soothing, e.g. through self-compassion, because they believe that their self-attack and self-inhibition are protective.

One implication for effective interventions with self-critical populations may therefore be that although they need to learn how to self-soothe in order to emotionally regulate, and although this will necessarily involve using “affiliative” systems, this may need to be done in a very gradual way to avoid triggering an overly aversive response (Study 15, 18). A further possibility is that in addition to ameliorating self-attack, interventions could usefully focus on lessening self-inhibition, or teaching an alternative to submission in the face of threat. Scaer (2012) argues that a sense of helplessness in the face of threat will lead to prolonged trauma symptoms unless the last-resort “freeze” response elicited at

the time of the threat can be “discharged” – in other words, the individual needs to regain a sense of agency through completing the “fight” or “flight” responses that were unsuccessful at the time the trauma occurred. In clinical terms, this may explain the value of interventions encouraging emotional expression or “talking back” to self-critical voices.

Much remains to be explored in order to determine the most effective ways of enabling individuals to re-engage with affiliative systems in order to self-soothe and to reduce self-inhibition. Future research should address which aspects of self-compassion training are most helpful for which people, perhaps including qualitative methodology. Further attention should also be paid to common factors such as benefits of group versus individual treatment. If possible behavioural and physiological measures should be incorporated to measure outcomes, in addition to self-report measures. Additionally potential benefits have been demonstrated by “security priming” even for individuals with insecure attachment styles. Gillath, Selcuk and Shaver (2008) point out that despite generalised negative expectations based on early care, people also possess “many different *specific* (emphasis added) memories, corresponding to *specific* (emphasis added) attachment experiences, and different working models corresponding to different kinds or categories of attachment experiences . . . (which) form a complex network of excitatory or inhibitory links . . . . When an individual is treated in a security-enhancing way by an attachment figure, or when he or she thinks about a previous experience of that kind, the memories of other successful bids for proximity are activated and memories of unsuccessful proximity seeking attempts are inhibited” (Gillath, Selcuk & Shaver, 2008, p. 1655). In this way attachment-based security priming seems to be able to promote affiliative responses even in those with insecure

attachment styles, rather than simply triggering further aversion responses, and this may be an area which could be further explored in relation to self-criticism. Furthermore, future studies should be conducted with clinical populations, incorporating follow-up in the study design and measuring impact on functioning as well as self-reported self-compassion and self-criticism.

The present review has certain limitations. A second reviewer was not available to read studies, and publication bias may have limited the studies available for review. Time constraints did not permit a search of “grey literature.” The scope of this study did not permit inclusion of the concept of “shame” in the search terms, although this has been identified as an important aspect of self-criticism (Gilbert, 2009), and future reviews could usefully seek to remedy this omission.

Conclusion

The articles reviewed identified that teaching self-compassion, a relational focus and emotional expression may be important in combating self-criticism, and that self-criticism and low self-compassion are consistently associated with attachment insecurity. Future studies could usefully examine which aspects of self-compassion training are most helpful for whom and the role of common factors (e.g. group treatment). They should also collect longer-term behavioural and physiological outcomes in addition to self-report, investigate whether security priming can aid self-compassion, and whether interventions are consistently effective with clinical populations.

References

Braehler, C., Gumley, A., Harper, J., Wallace, S., Norrie, J., & Gilbert, P. (2013). Exploring change processes in compassion focused therapy in psychosis: Results of a feasibility randomized controlled trial. *British Journal of Clinical Psychology*, *52*(2), 199-214.

Breines, J., & Chen, S. (2013). Activating the inner caregiver: The role of support-giving schemas in increasing state self-compassion. *Journal of Experimental Social Psychology, 49*, 58-64.

Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment, 15,* 199-208.

Gilbert, P., & Irons, C. (2004). A pilot exploration of the use of compassionate images in a group of self-critical people. *Memory, 12*, 507-516.

Gilbert, P., McEwan, K., Catarino, F., Baião, R., & Palmeira, L. (2014). Fears of happiness and compassion in relationship with depression, alexithymia, and attachment security in a depressed sample. *British Journal of Clinical Psychology*, *53*(2), 228-244.

Gilbert, P., McEwan, K., Matos, M., & Rivis, A. (2011). Fears of compassion: Development of three self-report measures. *Psychology and psychotherapy*, *84*, 239-255.

Gilbert, P., & Procter, S. (2006). Compassionate mind training for people with hig h shame and self-criticism: Overview and pilot study of a group therapy approach. *Clinical Psychology and Psychotherapy, 13*, 353-379.

Gillath, O., Selcuk, E., & Shaver, P.R. (2008). Moving toward a secure attachment style: Can repeated security priming help? *Social and Personality Psychology Compass, 2,* 1651-1666.

Irons, C., Gilbert, P., Baldwin, M. W., Baccus, J. R., & Palmer, M. (2006). Parental recall, attachment relating and self-attacking/self-reassurance: their relationship with depression. *The British Journal of Clinical Psychology,45,* 297-308.

Jazaieri, H., Jinpa, G. T., McGonigal, K., Rosenberg, E. L., Finkelstein, J., Simon-Thomas, E., Cullen, M., et al. (2013). Enhancing compassion: A randomized controlled trial of a compassion cultivation training program. *Journal of Happiness Studies*, *14*, 1113-1126.

Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., & Goldin, P. R. (2014). A randomized controlled trial of compassion cultivation training: Effects on mindfulness, affect, and emotion regulation. *Motivation and Emotion*, *38*, 23-35.

Kannan, D., & Levitt, H. (2013). A review of client self-criticism in psychotherapy. *Journal of Psychotherapy Integration, 23*, 166-178.

Kelly, A. C., Zuroff, D. C., Leybman, M. J., & Gilbert, P. (2012). Social safeness, received social support, and maladjustment: Testing a tripartite model of affect regulation. *Cognitive Therapy and Research*, *36*, 815-826.

Kelly, A. C., Zuroff, D. C., & Shapira, L. B. (2009). Soothing oneself and resisting self-attacks: The treatment of two intrapersonal deficits in depression vulnerability. *Cognitive Therapy and Research*, *33*, 301-313.

Lucre, K. M., & Corten, N. (2013). An exploration of group compassion-focused therapy for personality disorder. *Psychology and Psychotherapy: Theory, Research and Practice*, *86*, 387-400.

Mikulincer, M., & Shaver, P.R. (2005). Attachment security, compassion and altruism. *Current Directions in Psychological Science, 14*, 34-38.

Mikulincer, M., & Shaver, P. R. (2007). Boosting attachment security to promote mental health , prosocial values, and inter-group tolerance. *Psychological Inquiry*, *18*, 139-156.

Neff, K. (2003). Self-compassion : An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, *2,* 85-101.

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*, *69*, 28-44.

Neff, K. D., & McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity*, *9*, 225-240.

Porges, S. (2003). Social engagement and attachment: A phylogenetic perspective. *Annals of the New York Academy of Sciences, 1008*, 31-47.

Raque-Bogdan, T. L., Ericson, S. K., Jackson, J., Martin, H. M., & Bryan, N. A. (2011). Attachment and mental and physical health: self-compassion and mattering as mediators. *Journal of counseling psychology*, *58*, 272-278.

Rockliff, H., Gilbert, P., McEwan, K., Lightman, S., & Glover, D. (2008). A pilot exploration of heart rate variability and salivary cortisol responses to compassion-focused imagery. *Clinical Neuropsychiatry*, *5*, 132-139.

Rockliff, H., Karl, A., McEwan, K., Gilbert, J., Matos, M., & Gilbert, P. (2011). Effects of intranasal oxytocin on “compassion focused imagery”. *Emotion*, 11, 1388-1396.

Scaer, R. (2012). *Eight keys to brain-body balance.* London: Norton.

Schanche, E., Stiles, T. C., McCullough, L., Svartberg, M., & Nielsen, G. H. (2011). The relationship between activating affects, inhibitory affects, and self-compassion in patients with Cluster C personality disorders. *Psychotherapy*, *48*, 293-303.

Shahar, B., Carlin, E. R., Engle, D. E., Hegde, J., Szepsenwol, O., & Arkowitz, H. (2012). A pilot investigation of emotion-focused two-chair dialogue intervention for self-criticism. *Clinical Psychology and Psychotherapy*, *19*, 496-507.

Shahar, B., Szsepsenwol, O., Zilcha-Mano, S., Haim, N., Zamir, O., Levi-Yeshuvi, S., & Levit-Binnun, N. (2014). A wait-list randomized controlled trial of loving-kindness meditation programme for self-criticism. *Clinical Psychology and Psychotherapy*. Doi: 10.1002/cpp.1893

Troop, N., Chilcot, J., Hutchings, L. & Varnaite, G. (2012). Expressive writing, self-criticism and self-reassurance. *Psychology and Psychotherapy, 86,* 374-86.

Wei, M., Yu-Hsin Liao, K., Ku, T-Y., & Shaffer, P. (2011). Attachment, self-compassion, empathy and subjective well-being among college students and community adults. *Journal of Personality, 79*, 191-220.

Appendix A: Key to Reviewed Studies

1. Schanche, E., Stiles, T. C., McCullough, L., Svartberg, M., & Nielsen, G. H. (2011). The relationship between activating affects, inhibitory affects, and self-compassion in patients with Cluster C personality disorders. *Psychotherapy*, *48*, 293-303.
2. Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*, *69*, 28-44.
3. Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., & Goldin, P. R. (2014). A randomized controlled trial of compassion cultivation training: Effects on mindfulness, affect, and emotion regulation. *Motivation and Emotion*, *38*, 23-35.
4. Jazaieri, H., Jinpa, G. T., McGonigal, K., Rosenberg, E. L., Finkelstein, J., Simon-Thomas, E., Cullen, M., et al. (2013). Enhancing compassion: A randomized controlled trial of a compassion cultivation training program. *Journal of Happiness Studies*, *14*, 1113-1126.
5. Gilbert, P., & Procter, S. (2006). Compassionate mind training for people with hifh shame and self-criticism: Overview and pilot study of a group therapy approach. *Clinical Psychology and Psychotherapy, 13*, 353-379.
6. Lucre, K. M., & Corten, N. (2013). An exploration of group compassion-focused therapy for personality disorder. *Psychology and Psychotherapy: Theory, Research and Practice*, *86*, 387-400.
7. Troop, N., Chilcot, J., Hutchings, L. & Varnaite, G. (2012). Expressive writing, self-criticism and self-reassurance. *Psychology and Psychotherapy, 86,* 374-86.

8. Braehler, C., Gumley, A., Harper, J., Wallace, S., Norrie, J., & Gilbert, P. (2013). Exploring change processes in compassion focused therapy in psychosis: Results of a feasibility randomized controlled trial. *British Journal of Clinical Psychology*, *52*(2), 199-214.
9. Shahar, B., Carlin, E. R., Engle, D. E., Hegde, J., Szepsenwol, O., & Arkowitz, H. (2012). A pilot investigation of emotion-focused two-chair dialogue intervention for self-criticism. *Clinical Psychology and Psychotherapy*, *19*, 496-507.
10. Shahar, B., Szsepsenwol, O., Zilcha-Mano, S., Haim, N., Zamir, O., Levi-Yeshuvi, S., & Levit-Binnun, N. (2014). A wait-list randomized controlled trial of loving-kindness meditation programme for self-criticism. *Clinical Psychology and Psychotherapy*. Doi: 10.1002/cpp.1893
11. Gilbert, P., & Irons, C. (2004). A pilot exploration of the use of compassionate images in a group of self-critical people. *Memory, 12*, 507-516.
12. Kelly, A. C., Zuroff, D. C., & Shapira, L. B. (2009). Soothing oneself and resisting self-attacks: The treatment of two intrapersonal deficits in depression vulnerability. *Cognitive Therapy and Research*, *33*, 301-313.
13. Breines, J., & Chen, S. (2013). Activating the inner caregiver: The role of support-giving schemas in increasing state self-compassion. *Journal of Experimental Social Psychology, 49*, 58-64.
14. Neff, K. D., & McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity*, *9*, 225-240.

15. Rockliff, H., Gilbert, P., McEwan, K., Lightman, S., & Glover, D. (2008). A pilot exploration of heart rate variability and salivary cortisol responses to compassion-focused imagery. *Clinical Neuropsychiatry*, *5*, 132-139.
16. Gilbert, P., McEwan, K., Catarino, F., Baião, R., & Palmeira, L. (2014). Fears of happiness and compassion in relationship with depression, alexithymia, and attachment security in a depressed sample. *British Journal of Clinical Psychology*, *53*(2), 228-244.
17. Raque-Bogdan, T. L., Ericson, S. K., Jackson, J., Martin, H. M., & Bryan, N. A. (2011). Attachment and mental and physical health: self-compassion and mattering as mediators. *Journal of counseling psychology*, *58*, 272-278.
18. Rockliff, H., Karl, A., McEwan, K., Gilbert, J., Matos, M., & Gilbert, P. (2011). Effects of intranasal oxytocin on “compassion focused imagery”. *Emotion*, 11, 1388-1396.
19. Kelly, A. C., Zuroff, D. C., Leybman, M. J., & Gilbert, P. (2012). Social safeness, received social support, and maladjustment: Testing a tripartite model of affect regulation. *Cognitive Therapy and Research*, *36*, 815-826.
20. Wei, M., Yu-Hsin Liao, K., Ku, T-Y., & Shaffer, P. (2011). Attachment, self-compassion, empathy and subjective well-being among college students and community adults. *Journal of Personality, 79*, 191-220.
21. Irons, C., Gilbert, P., Baldwin, M. W., Baccus, J. R., & Palmer, M. (2006). Parental recall, attachment relating and self-attacking/self-reassurance: their relationship with depression. *The British Journal of Clinical Psychology, 45,* 297-308.

Appendix B: Instructions for Journal Submission

‘Emotion’ Instructions for Authors

Prior to submission, please carefully read and follow the submission guidelines detailed below. Manuscripts that do not conform to the submission guidelines may be returned without review.

Submission

Submit manuscripts electronically through the Manuscript Submission Portal in Word Document format (.doc).

All tables and figures should be included in the manuscript file.

David DeSteno
Northeastern University
Boston, MA 02115

General correspondence may be directed to the Editor's Office.

Masked Review Policy

Masked reviews are optional, and authors who wish masked reviews must specifically request them when they submit their manuscripts.

For masked reviews, the manuscript must include a separate title page with the authors' names and affiliations, and these ought not to appear anywhere else in the manuscript. Footnotes that identify the authors must be typed on a separate page. Authors are to make every effort to see that the manuscript itself contains no clues to their identities.

If your manuscript was mask reviewed, please ensure that the final version for production includes a byline and full author note for typesetting.

Manuscript Submission Guidelines

In addition to addresses and phone numbers, authors should supply email addresses and fax numbers for use by the editorial office and later by the production office. The majority of correspondence between the editorial office and authors is handled by email, so a valid email address is important to the timely flow of communication during the editorial process.

Authors should provide email addresses in their cover letters and should keep a copy of the manuscript to guard against loss. Manuscripts are not returned.

Manuscripts for *Emotion*® can vary in length; typically they will range from 10 to 40 double-spaced manuscript pages. Manuscripts should be of sufficient length to ensure theoretical and methodological competence.

Most of the articles published in *Emotion* will be reports of original research, but other types of articles are acceptable.

- Case studies from either a clinical setting or a laboratory will be considered if they raise or illustrate important questions that go beyond the single case and have heuristic value.
- Articles that present or discuss theoretical formulations of emotion and related affective phenomena that evaluate competing theoretical perspectives, or that offer innovative commentary or analysis on timely topics of inquiry may also be accepted.
- Comprehensive reviews of the empirical literature in an area of study are acceptable if they contain a meta-analysis and/or present novel theoretical or methodological perspectives.
- Comments on articles published in the journal will be considered.

To facilitate a more complete understanding of the reported results, submissions based on empirical findings must report effect sizes and 95% confidence intervals for the primary findings in each study.

Brief Reports

Emotion also publishes brief reports. Manuscripts submitted as Brief Reports should not exceed 2,500 words, exclusive of references and figure captions. There should be no more than 2 figures or tables and no more than 30 references.

Manuscript Preparation

Prepare manuscripts according to the *Publication Manual of the American Psychological Association* (6th edition). Manuscripts may be copyedited for bias-free language (see Chapter 3 of the *Publication Manual*).

Review APA's Checklist for Manuscript Submission before submitting your article.

Double-space all copy. Other formatting instructions, as well as instructions on preparing tables, figures, references, metrics, and abstracts, appear in the *Manual*.

Below are additional instructions regarding the preparation of display equations, computer code, and tables.

Display Equations

We strongly encourage you to use MathType (third-party software) or Equation Editor 3.0 (built into pre-2007 versions of Word) to construct your equations, rather than the equation support that is built into Word 2007 and Word 2010. Equations composed with the built-in Word 2007/Word 2010 equation support are converted to low-resolution graphics when they enter the production process and must be rekeyed by the typesetter, which may introduce errors.

To construct your equations with MathType or Equation Editor 3.0:

- Go to the Text section of the Insert tab and select Object.
- Select MathType or Equation Editor 3.0 in the drop-down menu.

If you have an equation that has already been produced using Microsoft Word 2007 or 2010 and you have access to the full version of MathType 6.5 or later, you can convert this equation to MathType by clicking on MathType Insert Equation. Copy the equation from Microsoft Word and paste it into the MathType box. Verify that your equation is correct, click File, and then click Update. Your equation has now been inserted into your Word file as a MathType Equation.

Use Equation Editor 3.0 or MathType only for equations or for formulas that cannot be produced as Word text using the Times or Symbol font.

Computer Code

Because altering computer code in any way (e.g., indents, line spacing, line breaks, page breaks) during the typesetting process could alter its meaning, we treat computer code differently from the rest of your article in our production process. To that end, we request separate files for computer code.

In Online Supplemental Material

We request that runnable source code be included as supplemental material to the article. For more information, visit Supplementing Your Article With Online Material.

In the Text of the Article

If you would like to include code in the text of your published manuscript, please submit a separate file with your code exactly as you want it to appear, using Courier New font with a type size of 8 points. We will make an image of each segment of code in your article that exceeds 40 characters in length. (Shorter snippets of code that appear in text will be typeset in Courier New and run in with the rest of the text.) If an appendix contains a mix of code and explanatory text, please submit a file that contains the entire appendix, with the code keyed in 8-point Courier New.

Tables

Use Word's Insert Table function when you create tables. Using spaces or tabs in your table will create problems when the table is typeset and may result in errors.

Submitting Supplemental Materials

APA can place supplemental materials online, available via the published article in the PsycARTICLES® database. Please see Supplementing Your Article With Online Material for more details.

Abstract and Keywords

All manuscripts must include an abstract containing a maximum of 250 words typed on a separate page. After the abstract, please supply up to five keywords or brief phrases.

References

List references in alphabetical order. Each listed reference should be cited in text, and each text citation should be listed in the References section.

Examples of basic reference formats:

- **Journal Article:**
  Hughes, G., Desantis, A., & Waszak, F. (2013). Mechanisms of intentional binding and sensory attenuation: The role of temporal prediction, temporal control, identity prediction, and motor prediction. *Psychological Bulletin, 139,* 133–151. http://dx.doi.org/10.1037/a0028566
- **Authored Book:**
  Rogers, T. T., & McClelland, J. L. (2004). *Semantic cognition: A parallel distributed processing approach.* Cambridge, MA: MIT Press.
- **Chapter in an Edited Book:**
  Gill, M. J., & Sypher, B. D. (2009). Workplace incivility and organizational trust. In P. Lutgen-Sandvik & B. D. Sypher (Eds.), *Destructive organizational communication: Processes, consequences, and constructive ways of organizing* (pp. 53–73). New York, NY: Taylor & Francis.

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DOCTORATE IN CLINICAL PSYCHOLOGY

MAJOR RESEARCH PROJECT COVER SHEET

Self-Compassion and Attachment Priming: Does Security Priming Aid Self-Compassion in Self-Critical Individuals?

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Primary Research Supervisor:	Dr Anke Karl Senior Lecturer in Clinical Psychology, College of Life and Environmental Sciences, University of Exeter
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Target Journal:	Emotion
Word Count:	8,325 words (excluding abstract, table of contents, list of figures, references and appendices)

Declaration:

"I certify that all material in this project which is not my own work has been identified and properly attributed. I have conducted the work in line with the BPS DCP Professional Practice Guidelines"

Submitted in partial fulfilment of requirements for the Doctorate Degree in Clinical Psychology, University of Exeter

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This project was completed in part collaboration with an MSc student, who assisted with some of the data collection and pre-processing of physiological data, but who has her own data set of EEG data which is not part of this dissertation. Initial proposal, literature review and research questions, ethics, set-up, recruitment, data analysis and writeup for this study were all undertaken by Amaryllis Roy.

Abstract

Self-compassion is increasingly recognised as beneficial in psychotherapy, but can also be experienced as threatening. Attachment priming has been shown to enhance affiliative behaviours even in those with insecure trait attachment styles, and to decrease arousal and threat sensitivity. The current study investigated (a) associations between self-criticism, self-compassion, fear of self-compassion and trait attachment insecurity, and (b) whether attachment-related security priming could promote state self-compassion and reduce physiological arousal when self-compassion induction was attempted by self-critical individuals. 49 participants with high levels of self-reported self-criticism completed either a “secure” or a “neutral” prime before undertaking a loving-kindness meditation. Participants’ heart rate and skin conductance levels were collected at baseline and during the priming and meditation; participants also self-rated their levels of state self-criticism, state self-compassion and state attachment security at each of these points. Correlational analyses (Spearman’s rho) found positive associations between trait self-criticism and trait attachment insecurity and between trait fear of self-compassion and trait attachment insecurity, although not between low trait self-compassion and trait attachment insecurity. Group and time differences were analysed using a combination of parametric (ANOVA, t-test) and non-parametric tests (Mann-Whitney U-test, Kruskal Wallis, Wilcoxon Signed Rank) as some data were not normally distributed). Attachment priming was shown to significantly enhance state self-compassion and also to significantly increase state attachment security and decrease state attachment avoidance, although not state self-criticism or state attachment anxiety, and to give some reductions in physiological arousal. This benefit, however, did not persist in subsequent

exposure to loving-kindness meditation, although individuals not receiving attachment priming also showed some reduction of threat and activation of soothing systems from loving-kindness meditation. These findings suggest that attachment priming and loving-kindness meditation may increase self-compassion for some self-critical people, but there are not necessarily cumulative benefits from combining these practices. Keywords: Attachment, security priming, self-compassion, self-criticism, loving-kindness

Introduction

Self-compassion is defined by Neff (2003a) as an attitude of kindness towards oneself in instances of pain or failure, rather than harsh self-criticism. Additional elements include perceiving one's experiences as part of the larger human condition, rather than as isolating, and holding painful thoughts and feelings in mindful awareness instead of over-identifying with them. The promotion of self-compassion is increasingly recognised as beneficial in psychotherapy, particularly for individuals prone to experiencing high levels of shame and self-criticism (Gilbert, 2009).

Gilbert (2009) postulates three 'affect regulation systems' based on reward, threat, and contentment, with the latter system focused on 'affiliative' emotions and helping to regulate the other two. This is similar to the "social engagement" neural system outlined by Porges (2003) which inhibits the sympathetic nervous system and the dorsal vagal complex, (which govern "fight or flight" responses), and promotes a calm physiological state in which sympathetic and parasympathetic nervous systems are in balance, which is indicated by higher variability in heart rate (Rockcliff, Gilbert, McEwan, Lightman & Glover, 2008). Compromise of this system renders adaptive social behaviour

difficult or impossible, and is observed in many forms of psychopathology (Porges, 2003).

Compassion-focused therapy (Gilbert, 2009), aims to bolster the social safety or soothing system, which is theorised to be insufficiently accessible to people with high levels of shame and self-criticism, often due to under-stimulation of this system in early life through poor attachment experiences (Gilbert, 2009).

One potential difficulty, however, is that for some individuals, attempting to stimulate self-compassion is actively unpleasant and/or physiologically stressful (Rockcliff et al., 2008, Longe et al. 2010), and that these can be amongst the most difficult to treat in therapy (Gilbert, 2009). Kirschner, Kuyken and Karl (2013) found that levels of trait self-criticism moderated positive response to loving-kindness meditation, whilst Duarte, McEwan, Barnes, Gilbert & Maratos (2014) found that exposure to compassionate imagery increased threat response in self-critical individuals. It is hypothesised that for such individuals, affiliative emotions can be experienced as aversive rather than calming as they reactivate feelings of threat or grief due to their association with neglectful or abusive caregiving in early life (Gilbert, McEwan, Mestos & Rivis, 2011). High self-criticism is associated with insecure attachment styles (Gilbert, Clarke, Hempel, Miles & Irons, 2004) and with fear of receiving compassion either from oneself or from others (Gilbert et al. 2011), whilst fear of compassion is associated with depression, anxiety and stress (Gilbert, McEwan, Catarino, Baiao & Palmeira (2014).

Attachment is defined as a behavioural system regulating proximity-seeking behaviour to caregivers in infancy (Mikulincer & Shaver, 2007).

Optimally, caregivers provide a “safe haven” when infants feel threatened and a “secure base” to facilitate exploration, and it is assumed that these early experiences will generalise into an “internal working model” (IWM) of self and other in relationships which is drawn on in later life. Where early caregiving has been inconsistent, neglectful or abusive, negative IWMs may give rise to a chronically insecure attachment style which persists into adulthood. Insecure attachment is often conceptualised along two dimensions, anxiety and avoidance, and it is hypothesised that these differing patterns of insecurity arise in response to the nature of the deficits in early care. An anxious attachment style is seen as arising from inconsistent care, where hyperactivation of attachment-seeking strategies was sometimes successful in obtaining caregiver attention, whilst an avoidant style is seen as arising in the context of an unresponsive or punitive caregiver, so that deactivation of attachment-seeking is most adaptive for the infant (Mikulincer & Shaver, 2007).

There is empirical evidence of the association between attachment security and regulation of fear and drive-based behaviours. “Security priming”, or stimulating thoughts of others with whom individuals have a close supportive relationship, has been shown to at least temporarily increase a range of pro-social and self-supportive behaviours and dispositions, regardless of long-term attachment style (Mikulincer & Shaver, 2005, Gillath, Selcuk & Shaver, 2008). Additionally, attachment-based security priming can reduce physiological arousal and threat bias to stressful stimuli in healthy individuals (Norman, Lawrence, Iles, Benattayallah & Karl, 2014, Karl et al., 2015, in preparation).

Based on the above theory and evidence, it could be surmised that individuals who experience difficulty with self-compassion may struggle both

because their affiliation system fails to regulate the threat system and because affiliative cues themselves can stimulate an overdeveloped threat system, which then easily overwhelms the weakened regulatory abilities of the affiliation system (Gilbert, 2005). From an attachment perspective the exercise of self-compassion could be seen as an activation of internal working models of self and other in the relationship with oneself, or put another way, provision of a "safe haven" and "secure base" for oneself. Unfortunately activating a problematic IWM of relationships may produce expectations of unreliability and threat rather than safety and comfort (Mikulincer & Shaver, 2007). Could the activation of these negative expectations be attenuated by priming alternative schemas? One way of doing so has been suggested by Breines & Chen (2013), who found that activating schemas of giving support to others increased state self-compassion.

Attachment theory might suggest, however, that it is important to have an experience of receiving care in order to be able to give it. Gillath, Selcuk and Shaver (2008) point out that despite generalised negative expectations based on early care, many people also possess memories of specific disconfirming experiences which if stimulated by similar treatment in the present can compete with the global insecure attachment style. Similarly, Baldwin, Keelan, Fehr, Enns and Koh-Rangarajoo (1996) showed that people possess a range of relational schemas and that the relative accessibility of a particular schema, although shaped by chronic attachment style, can also be influenced by contextual cues. In this way attachment-based security priming seems to be able to promote affiliative responses even in those with insecure attachment styles, rather than simply triggering further aversion responses. For example, Carnelley and Rowe (2007) found that repeated security priming improved

views of self and others regardless of chronic attachment style, as did Rowe and Carnelley (2003), Gillath, Selcuk and Shaver (2008) and Mikulincer and Shaver (2007).

A key procedure in many therapies is drawing the client's attention to specific "exceptions" to a generalised negative story. In the same way, it could be possible that priming specific attachment experiences may counteract problematic IWMs sufficiently to overcome the additional barriers to self-compassion in highly self-critical people.

In line with the theory outlined above, there are strong physiological "markers" of the activation of different affect regulation systems. Increased heart rate variability is associated with a balancing of parasympathetic and sympathetic nervous systems (Rockliff et al. 2008) which is in turn associated with the activation of the "social engagement" system. Increased heart rate and skin conductance are associated with threat responses and the activation of the sympathetic nervous system (e.g. Figner & Murphy, 2011). It thus should be possible to use physiological measurements to complement self-report and indicate differential responses to attachment priming and to self-compassion inductions.

Aims and Hypotheses

The aims of this study were to investigate associations between self-criticism, self-compassion, fear of self-compassion and trait attachment insecurity in self-critical people, and to determine whether attachment-related security priming can promote self-compassion and reduce threat response to self-compassion induction in self-critical individuals.

Hypotheses.

1(a) Consistent with previous research (e.g. Irons, Gilbert, Baldwin, Baccus & Palmer, 2006), higher levels of trait self-criticism will be associated with higher levels of trait attachment insecurity (anxiety and avoidance).

1(b) Consistent with previous research (e.g. Gilbert, McEwan, Catarino, Baiao & Palmeira, 2014, and Raque-Bogdan, Ericson, Jackson, Martin & Bryan, 2011), higher levels of fear of self-compassion will be associated with higher levels of trait attachment insecurity and with depression.

1(c) Consistent with previous research, (e.g. Wei, Liao, Ku & Shaffer, 2011), lower levels of trait self-compassion will be associated with higher levels of trait attachment insecurity.

2. Self-critical individuals receiving a secure attachment prime prior to a loving-kindness meditation exercise will report (a) reduced state self-criticism and state attachment anxiety and avoidance and enhanced state self-compassion and state attachment security relative to pre-priming measurements and to a neutrally-primed group, and (b) will experience greater benefit from a loving-kindness meditation exercise than a neutrally primed group, as measured by greater reductions in state self-criticism, state attachment anxiety and avoidance, and higher increases in state self-compassion and state attachment security.

3. Self-critical individuals receiving an attachment prime prior to a loving-kindness meditation exercise will show (a) reduced physiological arousal as measured by reduced heart rate and skin conductance and enhanced heart rate variability in comparison with a neutrally-primed group, and (b) will experience greater benefit from a loving-kindness meditation exercise than a neutrally

primed group, as measured by greater reductions in heart rate and skin conductance, and higher increases in heart rate variability.

Method

Design. The study used a correlational design to compare trait measures and a mixed within and between subjects experimental design to examine state measure and physiological data outcomes.

Participants and recruitment. Participants were students at the University of Exeter self-identifying as highly self-critical, recruited via university advertising on university premises and on the online study participation system. (See Table 1 and Figure 1 for full participant and recruitment details). Sample size was determined based on power calculations (see Appendix A). Exclusion criteria were kept to a minimum to aid recruitment, but individuals with cardio-vascular problems, epilepsy, severe skin conditions or allergies, or hearing problems were excluded for procedural and safety reasons. To be eligible, participants had to score 10 or more on the “Inadequate Self” (IS) scale of the FSCRS (Forms of Self Criticism/Reassurance Scale, Gilbert, Clarke, Hempel, Miles, & Irons, 2004). This measure was chosen as it has been widely used in previous research on self-criticism; the IS scale was chosen as a more appropriate measure of self-criticism in a non-clinical sample than the accompanying “Hated Self” (HS) scale which is designed to detect more extreme aspects of self-criticism. The maximum possible score on the FSCRS is 36; there are no specified “cutoffs” for levels of self-criticism. Prior to conducting the study, the researcher carried out a small-scale sampling of the measure with a consultation group of mental health service users in order to estimate a “benchmark” clinical level of self-criticism (*M* = 25,*SD* = 9.50, *Median*

= 26, *N* = 5). Within the overall sample of participants tested for the study, the mean FSCRS IS score was 22 (*SD* = 7), *Median* = 24, *N* = 49).

Students were offered course credits for their participation and entry into a prize draw for cash prizes of £50 and £25. The study received ethics approval from the University of Exeter (see Appendix B).

Measures.

Self-report trait. (See Appendix C for copies and further details of psychometric properties of all measures used).

The measure of trait self-criticism used was the Forms of Self Criticism/Reassurance Scale, FSCRS (Gilbert, Clarke, Hempel, Miles, & Irons, 2004). In this study, the Cronbach alphas were .83 for “inadequate self” and .72 for “hated self” subscales.

The measure of trait fear of self-compassion used was the 15-item “fear of compassion for self” subscale from the Fear of Compassion Scales, FoCS (Gilbert et al., 2011). In this study, the Cronbach alpha was .89.

The adult trait attachment style measure was the Experiences in Close Relationships Revised Scale, ECRS-R (Fraley, Waller & Brennan, 2000). Within this study the Cronbach alpha for the ECRS attachment anxiety score was .83, however the Cronbach alpha for the ECRS attachment avoidance score was .35 (see Results section for further discussion of implications).

The measure of trait self-compassion used was the Self Compassion Scale (Neff, 2003b). Within this study, the five-item self-kindness subscale alone was used as the “purest” measure of self-compassion due to poor

psychometric properties of the full scale (Williams, Dalgleish, Karl & Kuyken, 2014). The Cronbach alpha for the self-kindness scale in this study was .84.

Mood measure. The Patient Health Questionnaire (PHQ-9) is a widely used nine-item screening tool for depression, internal consistency has been demonstrated in the region of .86 to .89 (Kroenke, Spitzer & Williams, 2001). In this study, the Cronbach alpha was .87.

Self-report state visual analogue scales. In line with previous research (e.g. Norman et al. 2013, Kirschner, Kuyken & Karl, 2013), visual analogue scales were developed to allow participants to give “in the moment” 1-100 ratings of state self-criticism, self-compassion, attachment security, attachment anxiety and attachment avoidance (see Appendix D). The state measures were checked for comprehensibility and acceptability prior to the study with individuals with high self-criticism scores (FSCRS IS), and based in part on existing state measures e.g. State Adult Attachment Measure (Gillath, Hart, Noftle & Stockdale, 2009) and State Self-compassion Scale (Breines & Chen, 2013). Fuller state measures were not used during the procedure due to concerns that this would induce an analytical frame of mind in participants and potentially interfere with the impact of the manipulations, and to minimise the burden of an already lengthy procedure.

Materials.

Primes. Primes were written exercises of eight minutes’ duration. The attachment prime was based on Carnelly and Rowe (2007) and required participants to think and write about a person with whom they had a close relationship and how they felt within the context of this relationship. The ‘neutral’

prime asked participants to describe in detail a recent visit to a supermarket. See Appendix E.

Loving-kindness meditation. This was an audio exercise of approximately ten minutes in duration, spoken by an experienced meditation teacher and used in previous research (Kirschner, Kuyken & Karl, 2013). See Appendix F.

Physiological recording equipment. Skin conductance level (SCL) was recorded using a BIOPAC GSR100C amplifier and a skin resistant transducer (TSD203) from the middle phalanx of the first and ring finger of the participant's non dominant hand at a sampling rate of 500 Hz with a low pass filter of 1.0 Hz. ECG, for determination of heart rate (HR) and heart rate variability (HRV) was continuously recorded from below the participant's right collar bone and on the left hand side underneath the ribcage using a BIOPAC ECG100C amplifier at a sampling rate of 1 kHz with a low pass filter of 35 Hz and a high pass filter of .5 Hz.

Distraction task. This was administered at the end of the procedure to neutralise any possible negative mood induced by the experimental tasks. It was a short exercise asking participants to visualise everyday objects, adapted from Nolen-Hoeksema and Morrow (1993). See Appendix G.

Procedures. Participants completed an initial online screening to check for exclusion criteria and, if eligible, then completed a more detailed set of online questions including demographic information and all trait measures. Participants with sufficient self-criticism scores were then invited to participate in the laboratory procedure. Participants were pseudo-randomly allocated to groups; however, stratification was employed to control for levels of self-

criticism (FSCRS IS score) and for meditation experience. This was done on an "ad-hoc" basis by regularly checking the FSCRS IS scores and numbers of people with meditation experience in each condition. If the conditions appeared to be becoming unbalanced (e.g. higher FSCRS IS scores or greater meditation experience in one condition) subsequent high-scoring participants would be allocated to the opposite group. Analysis of the overall sample at the end of testing revealed no significant differences between the groups in terms of FSCRS IS scores (Group 1 *M* = 21.44 (*SD* = 7) *Median* = 23**,** Group 2 *M* = 22.46 (*SD* = 7) *Median* =24, *p* =.638 (Mann-Whitney U-test was used as FSCRS IS scores were non-normally distributed). For meditation experience, only 20% of the sample (10 participants) declared that they had previously undertaken meditation practice, and they were evenly split between groups.

Participants had already received information about the study and given consent to take part during the online data collection; however they were reminded of what was involved and given a hard copy consent form to read and sign (see Appendix H). They were then attached to the equipment used for the physiological data collection**.**

The experimental procedure was administered to participants via computer using E-Prime. Baseline state and physiological measures were collected before administration of either an attachment prime or a neutral prime, with physiological data collected throughout, and state measures collected at the end of the priming procedure. Both groups were then given the self-compassion meditation, with physiological data collected throughout and state measures collected at the end of the meditation. Finally participants completed the distraction task and were debriefed (Appendix I).

Preprocessing of physiological data.

Heart rate (HR). The heart rate determination in beats per minute was based on a semi-automatic R-wave detection algorithm implemented in the software AcqKnowledge (Version 4.1., BIOPAC Systems Inc., Goleta, CA). Raw ECG data were filtered applying a FIR bandpass filter between .5 and 35 Hz and 8000 coefficients. Artefact detection (i.e., noisy, missing or ectopic beats) and removal was performed using a template correlation and interpolation from the adjacent R-peaks based on Berntson and colleagues (Berntson, Quigley, Jang & Boysen, 1990; Berntson & Stowell, 1998) and Solem, Laguna and Sörnmo (2006). The interpolation procedure was used for less than 5% of the ECG data. Mean HR in beats per minute was then extracted from the R-waves for each data section. For priming, mean heart rates were determined from 1 to 8 minutes post priming in one -minute segments. One minute prior to the priming start was taken as baseline. For the meditation, heart rates were averaged for one minute prior to meditation start and measured in one-minute segments during the 12-minute meditation. Change in heart rate from baseline was then determined for each minute.

Heart rate variability (HF HRV) (as index of parasympathetic activation). Heart rate variability was determined from the artefact-free ECG (see above) by calculating a time series of the R-peaks and submitting it to a fast Fourier transformation that calculates the power spectrum of the R-R interval variation in a given time window (Berntson et al., 1997). Of particular interest was the frequency range between .15 Hz and .4 Hz (high frequency, HF). This high frequency band of HRV is generally considered a marker of

parasympathetic input. Mean HF HRV were then extracted for each data section similar to the heart rate.

Skin conductance level (SCL) (as measure of sympathetic arousal). Mean SCL, Maximum SCL values and minimum SCL values were extracted for the same time windows and a range correction as recommended by Lykken, Rose, Luther and Maley (1966) was applied to each data section for each participant to give a mean SCL corrected for individual differences. The formula for this was: Corrected SCL = (SCL mean – SCL min) / (SCL max-SCL min). As for the heart rate data, responses were then determined as changes from the baseline for each minute.

Analysis. See Appendix J for details of statistical data cleaning.

Statistical tests. Data were analysed using SPSS for Windows, Version 22. Correlational analyses were used for Hypothesis 1; non-parametric tests (Spearman's rho) were carried out as some of the questionnaire data was non-normally distributed (see above). The Bonferroni method was used to adjust significance value to 0.002 to allow for multiple testing (21 comparisons in total).

For visual analogue scale ratings of state self-compassion and state self-criticism data were analysed using 2 x 2 mixed ANOVA, group by time, at time points pre-priming versus post-priming and post-priming versus post-meditation. The Levene's test value was checked to ensure that the data met assumptions of homogeneity of variance. Post-hoc tests used were t-test for group effects and repeated measures ANOVA, separated by group, for effects of time.

For visual analogue scale ratings of state attachment (secure, anxious and avoidant) non-parametric tests were used (Mann Whitney U-test and

Kruskal-Wallis to compare groups, Friedman's ANOVA for effects of time, Wilcoxon Signed Rank test to compare time point pairs) as data were non-normally distributed. For physiological data these non-parametric tests were also used as data were non-normally distributed.

Results

Demographics and participant flowthrough. Table 1 (below) gives a breakdown of demographic characteristics of the sample by age, gender, and ethnicity.

Table 1

Demographic Data of Participants.

	Attachment prime group (N=25)	Neutral prime group (N=24)
Age range	18-44 (median =25)	18 to 49 (median=27)
Mean age	22 (SD=6)	24 (SD=8)
Female	84% (n=21)	83% (n=20)
Ethnicity	88% White European (n=22) 8% Asian (n=2) 4% Other (n=1)	71% White European (n=17) 21% Asian (n=5) 8% Other (n=2)

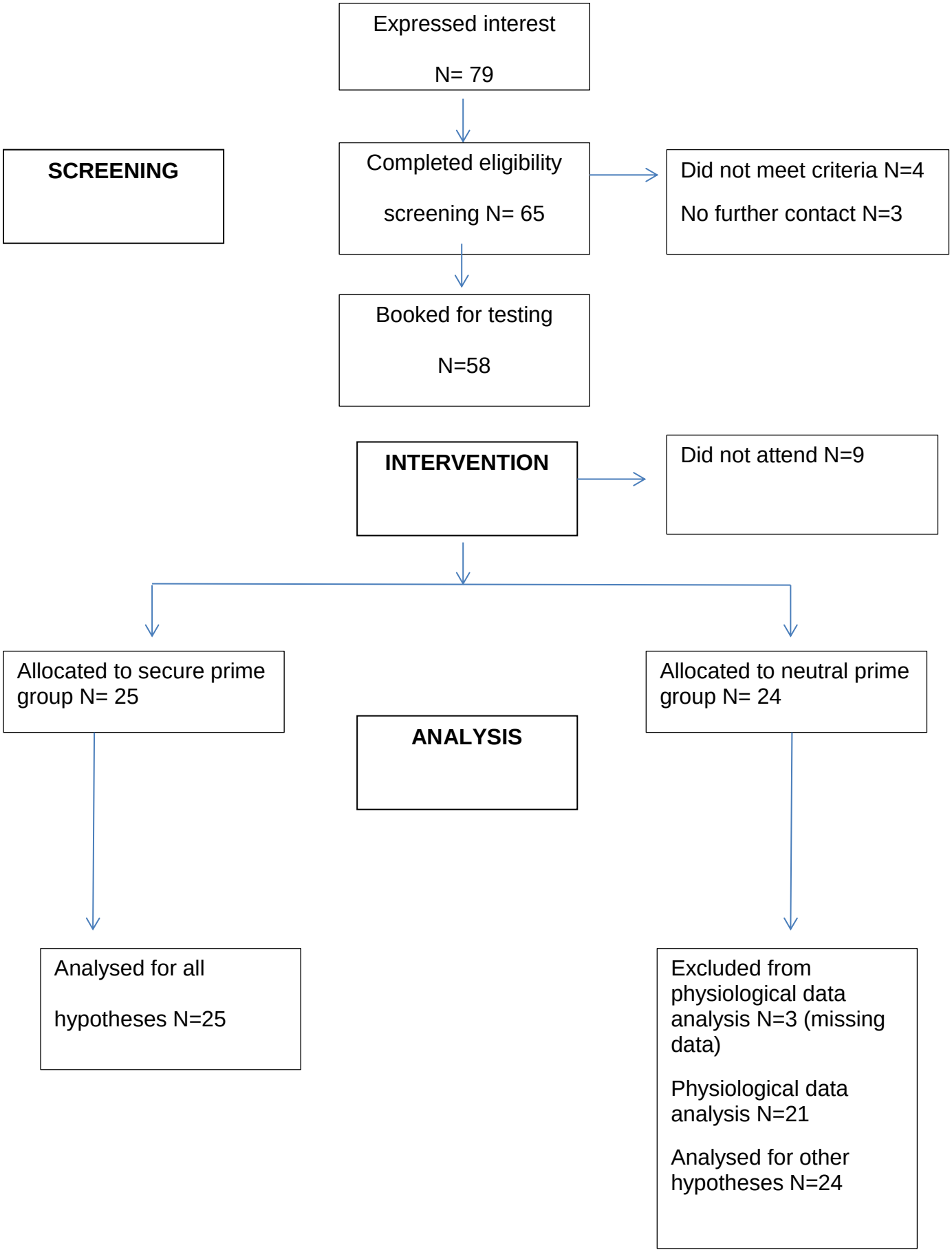

Figure 1. Flow of participants.

Results of hypothesis testing: Correlations of trait variables.

Note: Strength of association norms are taken from Cohen (1988) where small - .1, medium = .3, large = .5. Hypothesis 1 (a). As shown in Table 2 (overleaf) there is a moderate positive correlation between FSCRS HS ("hated self) and attachment anxiety, although this does not attain significance at the Bonferroni-corrected level. There is a moderate positive correlation between "hated self" and attachment avoidance, which does attain significance at the Bonferroni-corrected level. This should be treated with caution, however, due to the low Cronbach alpha score for the attachment avoidance dimension of the ECRS questionnaire in this study. There is a strong positive correlation between FSCRS IS ("inadequate self) and attachment anxiety, which does attain significance at the Bonferroni corrected level, and a weak positive correlation between "inadequate self" and attachment avoidance, which does not attain Bonferroni-corrected significance.

Hypothesis 1 (b). There is a strong positive correlation between fear of self-compassion (FOCS) and attachment anxiety, which attains Bonferroni-corrected significance. There is a moderate positive correlation between fear of self-compassion and attachment avoidance, which does not attain Bonferroni-corrected significance. There is a moderate positive correlation between fear of self-compassion and depression, which attains Bonferroni-corrected significance.

Hypothesis 1 (c). There is a weak negative correlation between SCS self-kindness and attachment anxiety, but this does not attain significance. There is a moderate negative correlation between SCS self-kindness and attachment

avoidance, but this does not attain significance at the Bonferroni-corrected level.

Table 2

Summary of Correlations, Means and Standard Deviations for Scores on the FSCRS, ECRS, FoCS, SCS, and PHQ-9 (Spearman's rho)

Measure	1	2	3	4	5	6	7
1. FSCRS HS	-	.551***(#)	.368**	.476***(#)	.379**	-.340**	.360**
2. FSCRS IS		-	.555***(#)	.315*	.520***(#)	-.514***(#)	.538***(#)
3. ECRS anxiety			-	.326*	.561***(#)	-.223	.532***(#)
4. ECRS avoidance				-	.323*	-.410**	.166
5. FoCS					-	-.330*	.497***(#)
6. SCS self-kindness						-	-.190
7. PHQ-9							-
Median	3	24	3.8	3.5	23	2.2	8.0
Range	10	27	4.17	4.06	47	3.4	16

* significant at p < .05 ** significant at p < .01 *** significant at p < .001 # significant at p <.002 (Bonferroni-corrected)

FSCRS = Forms of Self-Criticism/Reassurance Scale (HS= Hated Self, IS=Inadequate Self)
ECRS = Experiences in Close Relationships Scale, FoCS = Fear of Compassion Scales,
SCS = Self-Compassion Scale

Results of hypothesis testing: State self-report variables.

State self-criticism.

Hypothesis 2 (a) effects of priming. Repeated measures ANOVA with condition as between-subjects factor and time (pre-priming, post-priming) revealed a significant time by group interaction but no significant effects of time and condition (see Table K1). Post-hoc testing revealed no significant differences between groups at time point one (baseline), $t(47)=1.17$, $p = .249$, 95% CI [-6.86, 25.83], $d = .34$, or at time point two (post-priming) $t(47)=-1.40$, $p = .169$, 95% CI [-23.43, 4.22], $d = -.41$, and no significant within-group differences between time points one and two (attachment-primed group $F(1,24)$

= 2.88, p = .102, 95% CI [-1.89, 19.41], ηp^2 = .107, neutrally-primed group F (1,23) = 3.15, p = .089, 95% CI [-22.38, 1.72], ηp^2 =.120).

Hypothesis 2 (b) effects of meditation. Repeated measures ANOVA with condition as between-subjects factor and time (pre-meditation, post-meditation) revealed a significant time by group interaction and also a significant effect for time (see Table K2). Post-hoc testing revealed no significant differences between groups at time point three (post-meditation) t(47)=1.44, p =.157, 95% CI [-4.07, 24.48], d = .42, and no significant difference from pre-meditation for the attachment-primed group, F (1,24) = .420, p = .523, 95% CI [-11.05, 5.75], ηp^2 =.017 but a significant reduction of self-criticism from pre-meditation for the neutrally-primed group, F (1,23) = 15.69, p = .001, 95% CI [8.20, 26.13], ηp^2 =.406. See Figure 2.

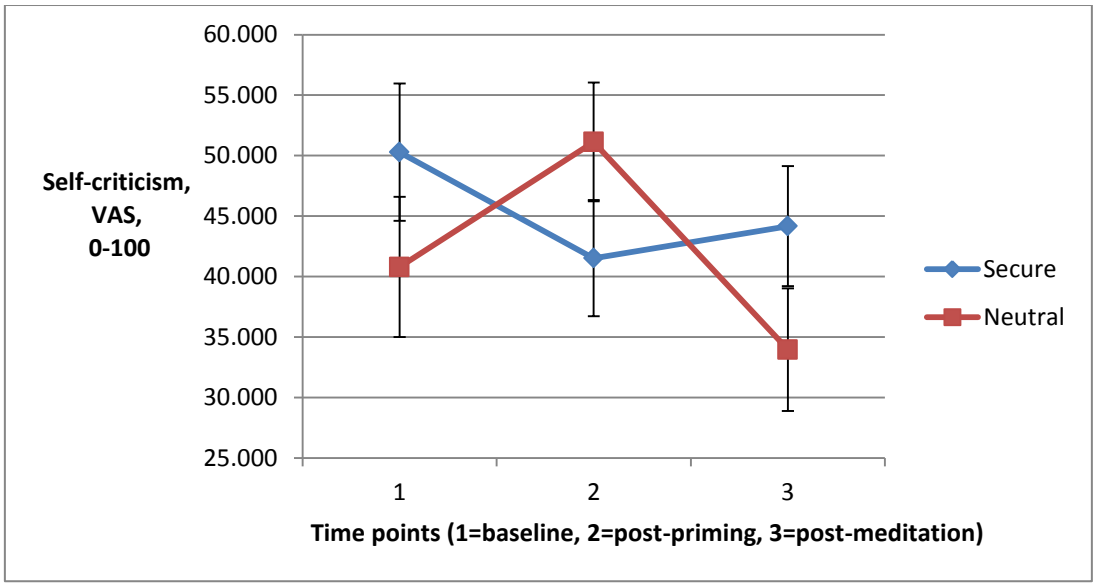

Figure 2. Mean state self-criticism scores pre-priming, post-priming and post-meditation, for secure and neutrally primed groups, error bars show standard error of mean (SE).

State self-compassion.

Hypothesis 2 (a) effects of priming. Repeated measures ANOVA with condition as between-subjects factor and time (pre-priming, post-priming) revealed a significant time by group interaction but no significant effects of time and condition (see Table K1). Post-hoc testing revealed no significant differences between groups at time point one (baseline), $t(47) = -1.18$, $p = .246$, 95% CI [-17.17,4.50], $d = .34$, or time point two (post-priming) $t(47) = .824$, $p = .417$, 95% CI [-6.41,15.23], $d = .24$, and no significant difference within the neutrally-primed group between time points one and two, $F(1,23) = .297$, $p = .591$, 95% CI [-4.19, 7.19], $\eta p^2 = .013$, but a significant increase in self-compassion from pre-priming to post-priming in the attachment-primed group, $F(1,24) = 7.93$, $p = .010$, 95% CI [-16.01,-2.47], $\eta p^2 = .248$.

Hypothesis 2 (b) effects of meditation. Repeated measures ANOVA with condition as between-subjects factor and time (pre-meditation, post-meditation) revealed a significant time by group interaction and also a significant effect for time (see Table K2). Post-hoc testing revealed no significant differences between groups at time point three (post-meditation) $t(47) = -.831$, $p = .410$, 95% CI [-16.99, 7.05], $d = -.24$, and no significant difference from pre- to post-meditation for the attachment-primed group, $F(1,24) = 1.49$, $p = .233$, 95% CI [-10.75, 2.75], $\eta p^2 = .059$, but a significant increase in self-compassion from pre- to post-meditation for the neutrally-primed group, $F(1,23) = 9.40$, $p = .005$, 95% CI [-22.4, -4.35], $\eta p^2 = .290$. See Figure 3.

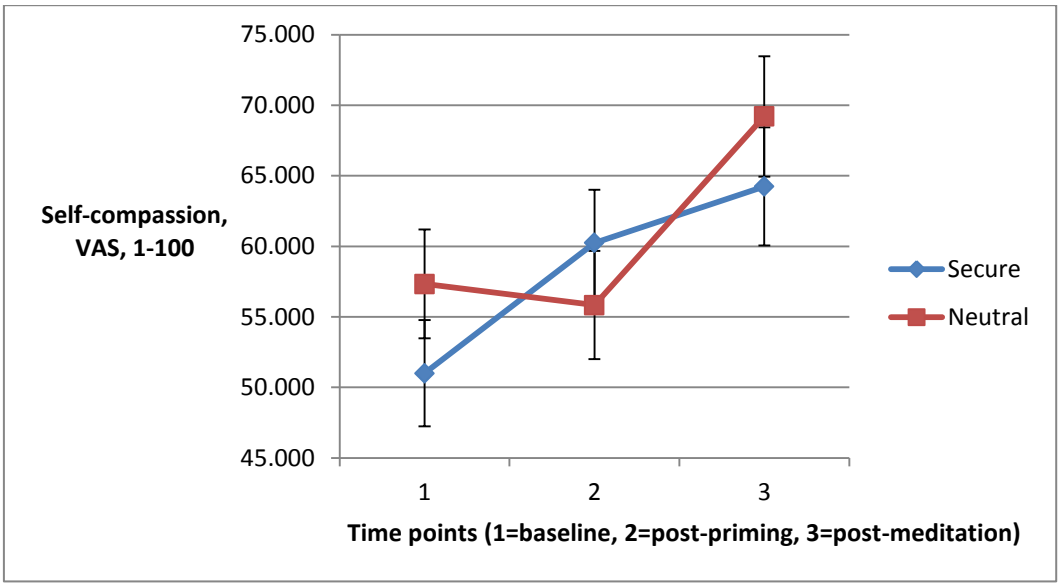

Figure 3. Mean state self-compassion scores pre-priming, post-priming and post-meditation, for secure and neutrally primed groups, with error bars.

State attachment security.

Hypothesis 2 (a) effects of priming. Mann-Whitney U-test showed no significant differences between groups at time points one (baseline, U=239.5, Z= -1.211 p=.226) and two (post-priming). Testing if secure attachment priming enhanced state attachment security relative to baseline, Wilcoxon Signed Ranks test showed a significant effect between time points one and two (pre and post-priming) in the attachment primed group and no significant effect in the neutrally primed group. See Table K3.

Hypothesis 2 (b) effects of meditation. Mann-Whitney U-test showed a significant difference between groups at time point three (post-meditation) but in the reverse of the expected direction (security was significantly greater in the neutral group). Testing if secure attachment priming enhanced response to loving-kindness meditation, there was a significant difference between time points two and three (post-priming and post-meditation) in the attachment

primed group, but in the reverse of the expected direction (decrease in attachment security). However, in the neutrally-primed group there was a significant increase in attachment security between time points two and three. See Table K4.

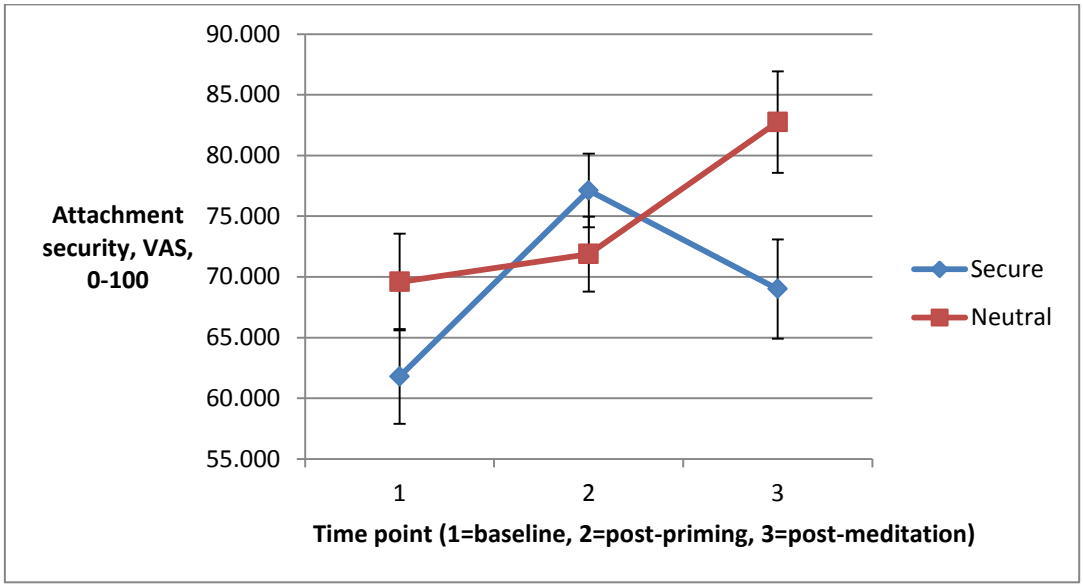

Figure 4. Mean state attachment security scores pre-priming, post-priming and post-meditation, for secure and neutrally primed groups, with error bars.

State attachment avoidance.

Hypothesis 2 (a) effects of priming. Mann-Whitney U-test showed no significant differences between groups at time points one (baseline, U= 249, Z=-1.021 p=.307) and two (post-priming) . Testing if secure attachment priming reduced state attachment avoidance relative to baseline, Wilcoxon Signed Ranks test showed a significant reduction between time points one and two (pre and post-priming) in the attachment primed group and no significant effect in the neutrally primed group. See Table K3.

Hypothesis 2 (b) effects of meditation. Mann-Whitney U-test showed no significant difference between groups at time point three (post-meditation).

Testing if secure attachment priming enhanced response to loving-kindness meditation, there was no significant difference between time points two and three (post-priming and post-meditation) in the attachment primed group, but in the neutrally primed group there was a significant reduction in attachment avoidance between these time points. See Table K4.

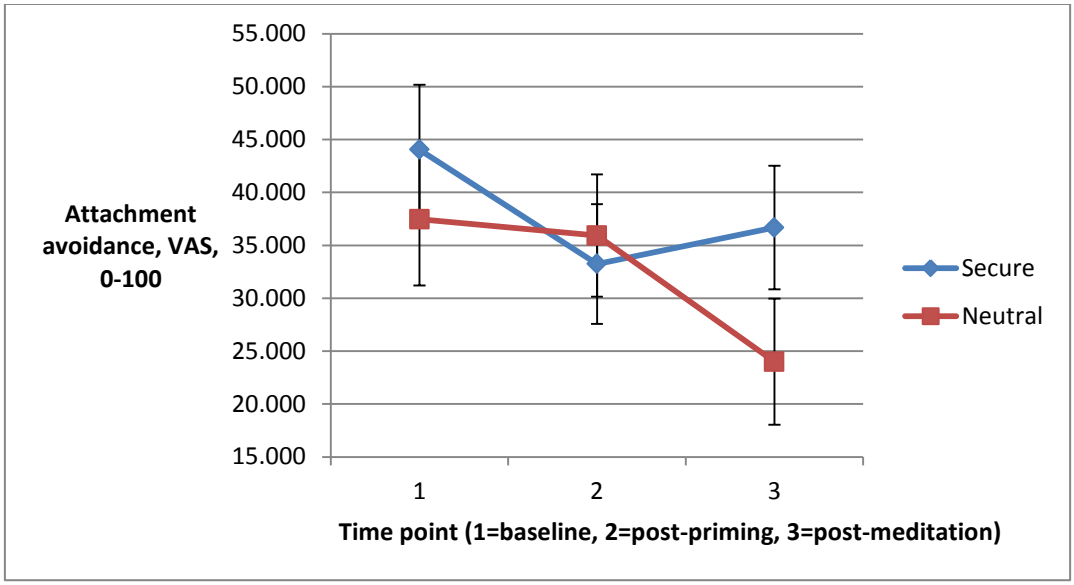

Figure 5. Mean state attachment avoidance scores pre-priming, post-priming and post-meditation, for secure and neutrally primed groups, with error bars.

State attachment anxiety.

Hypothesis 2 (a) effects of priming. Mann-Whitney U-test showed no significant differences between groups at time points one (baseline, U= 286.5, Z= -.270 p=.787) and two (post-priming). Testing if secure attachment priming reduced state attachment anxiety relative to baseline, Wilcoxon Signed Ranks test showed no significant differences between time points one and two (baseline and post-priming) in either the attachment-primed or the neutrally-primed groups. See Table K3.

Hypothesis 2 (b) effects of meditation. Mann-Whitney U-test showed no significant difference between groups at time point three (post-meditation). Testing if secure attachment priming enhanced response to loving-kindness meditation, there was a significant reduction in attachment anxiety in the attachment-primed group between time points two and three (post-priming and post-meditation), and no significant difference in the neutrally primed group. See Table K4.

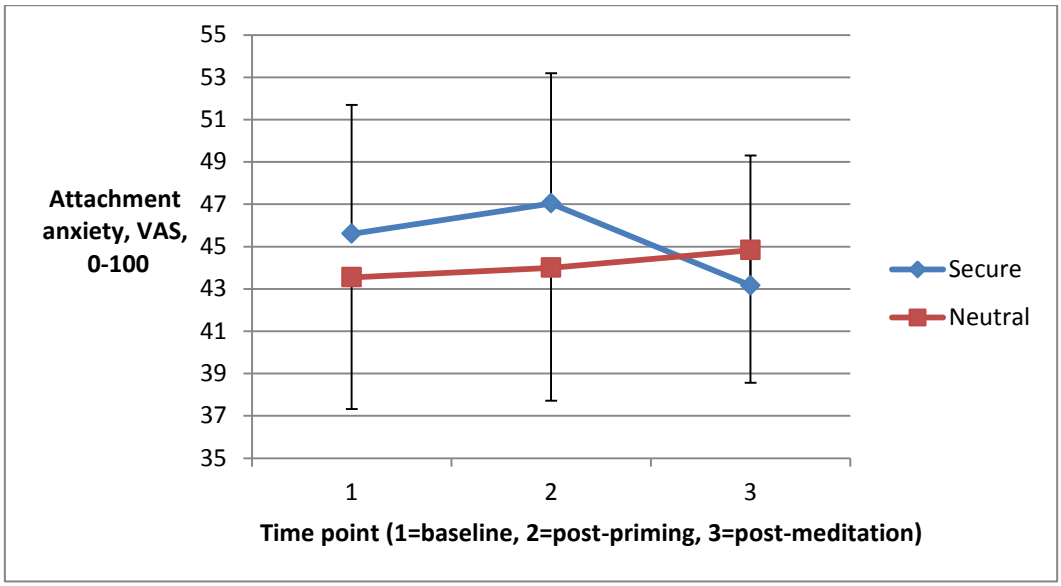

Figure 6. Mean state attachment anxiety scores pre-priming, post-priming and post-meditation, for secure and neutrally primed groups, with error bars.

Results of hypothesis testing: Physiological data.

Heart rate variability.

Hypothesis 3 (a) effects of priming. Group differences were checked for the period just prior to the start of the procedure and were not significant (U = 225, Z = -.827, p = .408), indicating that the pre-priming baselines were not different for the groups. Kruskal-Wallis test was used to compare groups' HRV responses at all time points, no significant differences were found (see Table

K5). Friedman's ANOVA was used to check for overall effect of time across both groups, no significant effect was found ($\chi^2(7) = 7.000$, $p = .429$), and for overall effect of time within groups, no significant effect was found (attachment group $\chi^2(7) = 5.95$, $p = .546$, neutral group $\chi^2(7) = 3.429$, $p = .843$). See Figure 7.

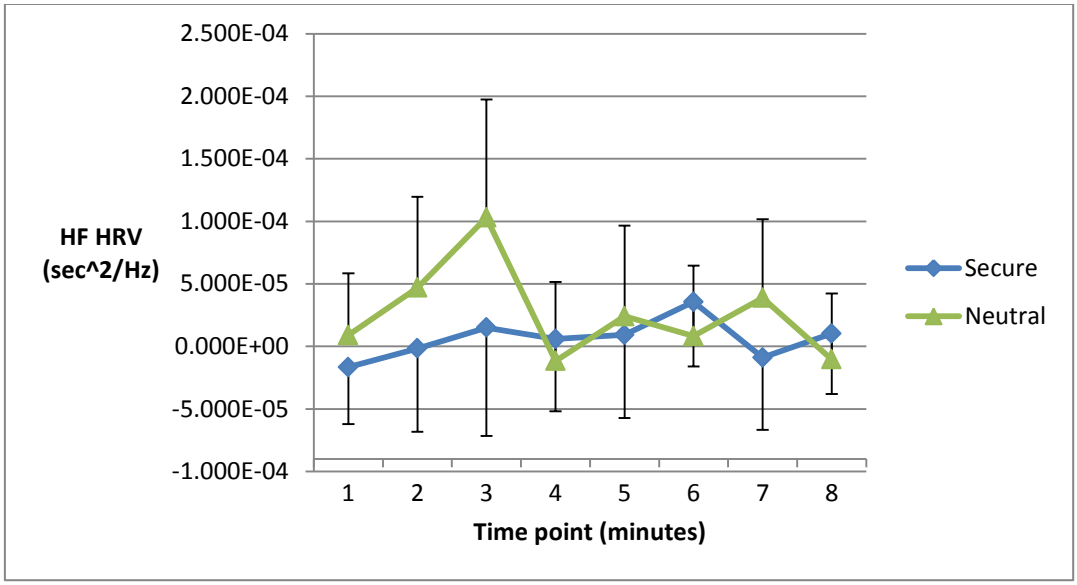

Figure 7. Mean heart rate variability during priming, with error bars.

Hypothesis 3 (b) effects of meditation. Group differences were checked for the period just prior to the start of the procedure, there was a significant difference between groups with heart rate variability higher in the attachment-primed group ($U = 165$, $Z = -2.150$, $p = .032$). However, no significant differences were found between groups at any time point during the meditation (Kruskal-Wallis test, see Table K6). Friedman's ANOVA was used to check for overall effect of time across both groups, no significant effect was found ($\chi^2(11) = 16.232$, $p = .133$), and for overall effect of time within groups, no significant effect was found (attachment group $\chi^2(11) = 10.41$, $p = .494$, neutral group $\chi^2(11) = 12.43$, $p = .332$). See Figure 8.

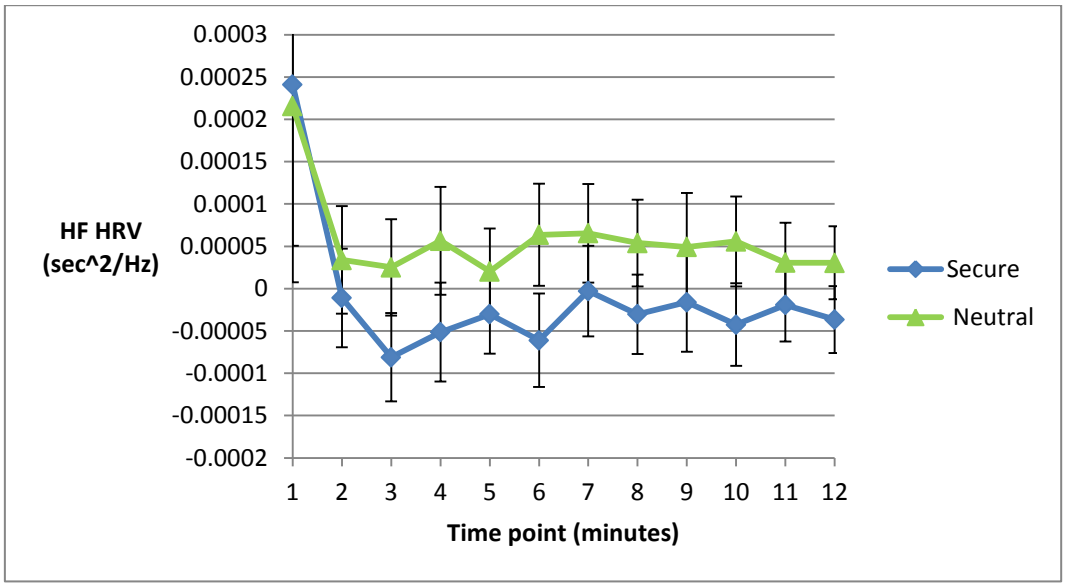

Figure 8. Mean heart rate variability during meditation, with error bars.

Heart rate.

Hypothesis 3 (a) effects of priming. Group differences were checked for the period prior to the start of the procedure and were not significant (U = 213, Z = -1.092 , p = .275). Kruskal-Wallis test was used to compare groups at all time points, significant differences in the expected direction (lower heart rate in securely primed group) were found at time points four, seven and eight (see Table K7). Friedman's ANOVA showed a significant overall effect of time across both groups ($\chi^2(7)$ = 15.59, p =.029), and significant overall effects were found for time within both groups (attachment group $\chi^2(7) = 17.25$, p =.016, neutral group $\chi^2(7) = 14.079$, p =.050) with an overall decrease in heart rate for the attachment-primed group and overall increase for the neutrally-primed group. See Figure 9.

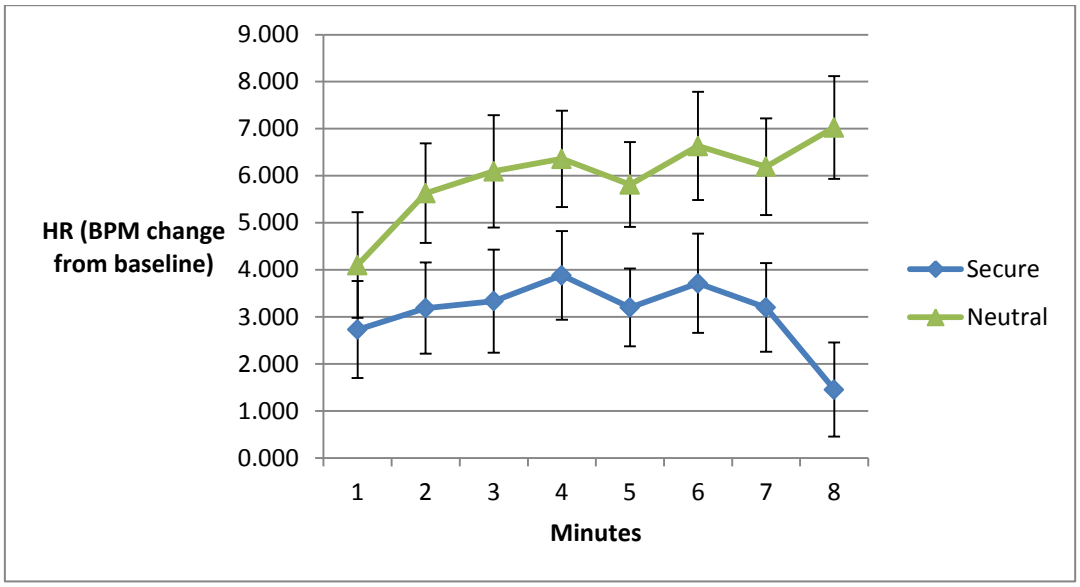

Figure 9. Mean heart rate during priming, with error bars.

Hypothesis 3 (b) effects of meditation. Group differences were checked for the period just prior to the start of the procedure, there was no significant difference between groups (*U*= 246, *Z*= - .364, *p* = .716. Significant differences in the reverse of the expected direction (lower heart rate in neutrally-primed group) were found between groups at all time points except minute five (Kruskal-Wallis test, see Table K8). Friedman's ANOVA was used to check for overall effect of time across both groups, a significant effect was found ($\chi^2(11) = 82.45$, p =<.001), and a significant overall effect of time was found within both groups (attachment group $\chi^2(11) = 51.77$, p =<.001, neutral group $\chi^2(11) = 39.64$, p = <.001), with an overall increase in heart rate for both groups. See Figure 10.

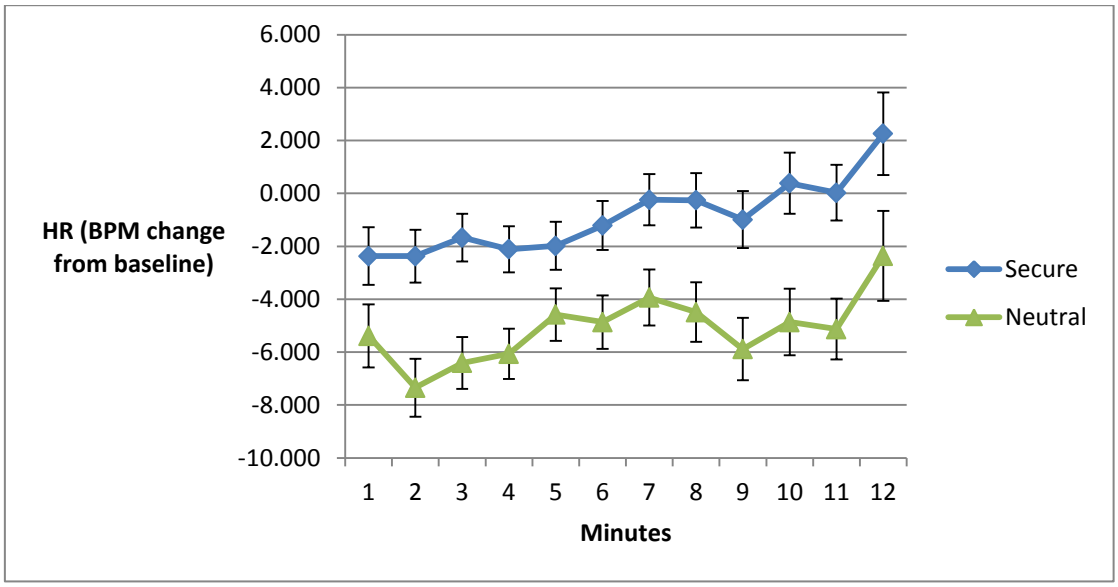

Figure 10. Mean heart rate during meditation, with error bars.

Skin conductance.

Hypothesis 3 (a) effects of priming. Group differences were checked for the period prior to the start of the procedure and were not significant (*U* = 211, *Z* = -1.136 , *p* = .256). Kruskal-Wallis test was used to compare groups at all time points, no significant differences were found (see Table K9). Friedman's ANOVA showed a significant overall effect for time across both groups ($\chi^2(7) = 88.674$, p =<.001), and for time within both groups (attachment group $\chi^2(7) = 37.13$, p =<.001, neutral group $\chi^2(7) = 56.75$, p =<.001, with an overall decrease in skin conductance for both groups. See Figure 11.

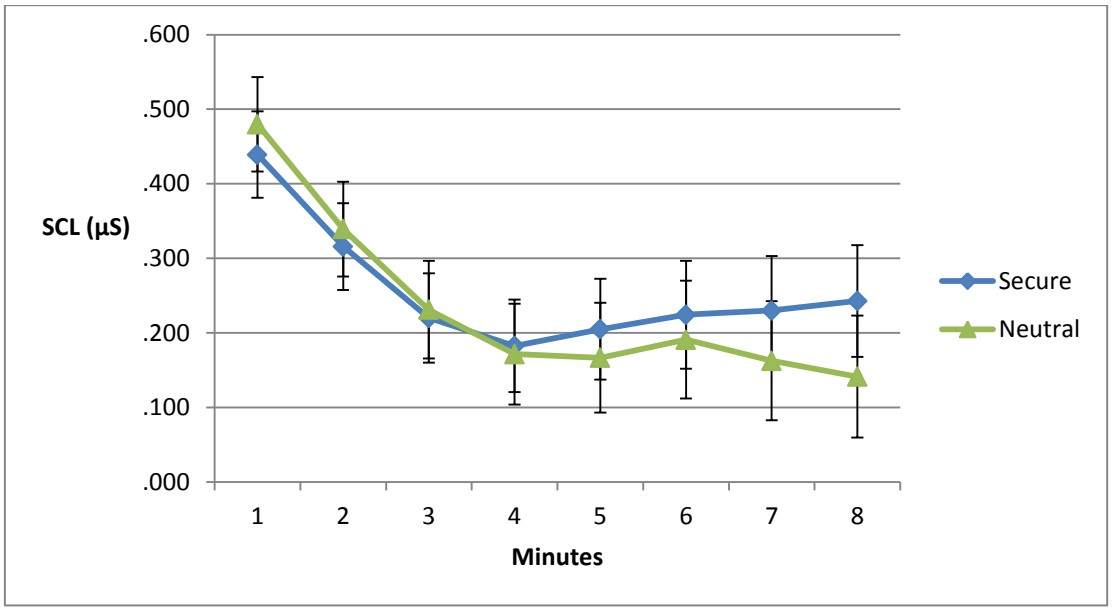

Figure 11. Mean skin conductance during priming, with error bars.

Hypothesis 3 (b) effects of meditation. Group differences were checked for the period just prior to the start of the procedure, there was a significant difference between groups (*U*= 170, *Z*= -2.010, *p* =.041), with lower skin conductance in the neutral group. Significant differences in the expected direction (lower skin conductance in the securely-primed group) were found between groups at minutes two to six (Kruskal-Wallis test, see Table K10). Friedman's ANOVA was used to check for overall effect of time across both groups, a significant effect was found ($\chi^2 (11) = 173$, p =<.001), and a significant overall effect of time was found within both groups (attachment group $\chi^2 (11) = 110.36$, p =.000, neutral group $\chi^2 (11) = 68.82$, p = <.001), with an overall decrease in skin conductance for both groups. See Figure 12.

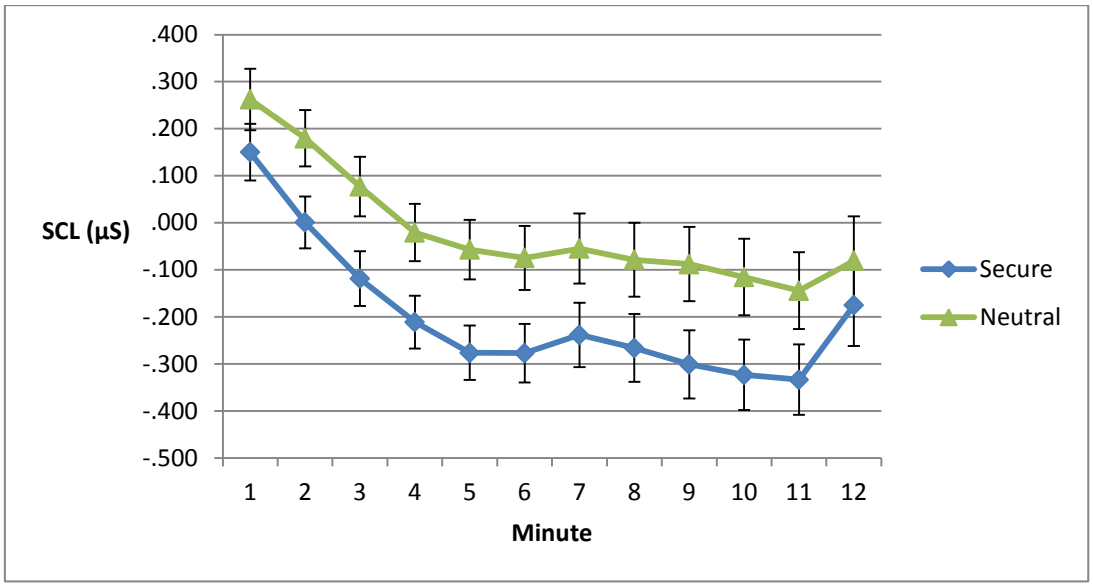

Figure 12. Mean skin conductance during meditation, with error bars.

Discussion

Extending previous research, this study looked at whether high trait self-criticism, low trait self-compassion and fear of self-compassion are associated with higher levels of trait attachment insecurity (anxious and avoidant attachment) in a sample of self-critical people. It also investigated whether attachment-related security priming can promote self-compassion and reduce threat response to self-compassion induction in self-critical individuals.

Trait variables.

As hypothesised, this study revealed significant positive associations between trait self-criticism and attachment insecurity, with moderate correlations between “hated self” self-criticism and avoidant attachment, and ‘inadequate self’ self-criticism and anxious attachment. There was also evidence of the hypothesised positive association between fear of self-compassion and attachment insecurity, with a strong correlation between fear of self-compassion and attachment anxiety, and fear of self-compassion was also

moderately correlated with depression. There was no strong evidence to support the hypothesis of a positive association between low self-compassion and attachment insecurity.

As predicted by previous research (Irons, Gilbert, Baldwin, Baccus & Palmer, 2006, Gilbert, McEwan, Catarino, Baiao & Palmeira, 2014), an association was found between self-criticism and fear of self-compassion and forms of attachment insecurity. Gilbert (2014) contends that for those with negative attachment experiences, affiliative emotions and experiences can be threatening and may be actively avoided through an internal process of “self-subordination” (individuals attack themselves as a form of “safety behaviour” to avoid attack from powerful others). Hence the findings of this study are in line with this prediction. Interestingly, they also suggest that attachment avoidance can be associated with a negative view of self, despite some propositions that attachment avoidance is more concerned with views of others (Brennan, Clark & Shaver, 1998). This may be because the current study did not distinguish between proposed subtypes of attachment avoidance (fearful and dismissing, Bartholomew and Horowitz, 1991). Additionally, this result should be treated with caution due to the low Cronbach alpha of the avoidance subscale of the ECRS (see Measures section).

In contrast to research by Wei, Liao, Ku & Shaffer (2011), and Raque-Bogdan, Ericson, Jackson, Martin & Bryan (2011), no significant association was found between low self-compassion and attachment insecurity. This was unexpected because attachment theory (Bowlby, 1969) predicts that internal working models of self and others are developed through early experiences with caregivers, and therefore it would be expected that a compassionate attitude to

the self would be less likely to develop in an insecure attachment context. Some previous studies, however, (e.g. Neff & McGehee, 2010) have found that insecure dismissive attachment was not significantly linked to self-compassion, so again, it may be that this study could have benefited from separating attachment avoidance subtypes. Additionally, high self-criticism is not necessarily synonymous with low-self-compassion; it is possible that competing schemas allow impulses of kindness towards the self, but that these then arouse fear (as predicted by Gilbert's model) and are subsequently attacked through self-criticism. It may also be that the current study failed to detect an effect due to relatively small sample size and the need to use only a small subset of items from the Self Compassion Scale due to poor psychometric properties of the full scale (see Measures section). It is also possible that no significant association could be found due to sample selection for high self-criticism, meaning generally lower self-compassion and therefore lower variability.

Effects of attachment priming and loving-kindness meditation.

In partial support of the hypothesis that self-critical individuals receiving an attachment prime would report reduced state self-criticism and attachment insecurity and enhanced state self-compassion and attachment security, the study revealed a significant reduction in attachment avoidance and a significant enhancement in self-compassion and attachment security for the attachment primed group, although it did not find the expected reduction in state self-criticism and attachment anxiety. The expected differential increase in heart rate variability or expected reduction in skin conductance for the attachment primed group was also absent. Although overall heart rate was raised from baseline

during priming for both groups, this was less in the secure group who also showed a downward trajectory over time, whilst the neutral group showed an upward trend.

Mixed results were found in answer to the hypothesis that attachment-primed individuals receiving a loving-kindness meditation would experience greater reductions in state self-criticism and attachment insecurity and higher increases in state self-compassion and attachment security than a neutrally-primed group. Whereas individuals who had previously received secure attachment priming showed significantly higher meditation-induced reductions in state attachment anxiety, this effect was not supported in relation to self-criticism, self-compassion, attachment avoidance or attachment security. Contrary to the hypotheses, individuals who had received the neutral prime showed some of the expected benefits predicted for the attachment-primed group (e.g. reductions in state self-criticism and attachment avoidance and increases in state self-compassion and attachment security). The hypothesis that attachment-primed individuals would show greater reduction in heart rate and skin conductance and greater increase in heart rate variability than a neutrally-primed group, was not supported in relation to heart rate or heart rate variability, but was supported in relation to skin conductance. Again, some findings were contrary to the hypotheses in that the neutrally-primed group appeared to show benefits from the loving-kindness meditation (heart rate, heart rate variability). See Table K11 for a full summary of results by group and time for each variable tested.

The results suggest that attachment priming increased state attachment security and reduced state attachment avoidance in a group of self-critical

people, and that this was accompanied by an increase in state self-compassion. This is consistent with expectations from previous research on the beneficial effects of attachment priming (e.g. Mikulincer & Shaver, 2005, Gillath, Selcuk & Shaver, 2008, Norman, Lawrence, Iles, Benattayallah & Karl, 2013) and the theoretical prediction that boosting positive relationship schemas should aid self-compassion (e.g. Baldwin, Keelan, Fehr, Enns and Koh-Rangarajoo, 1996). Notably, however, attachment priming did not produce the expected reduction in state self-criticism. It is possible that, in line with Gilbert's (2014) conception of self-criticism as a "safety behavior", it may become habitual and less responsive to a once-only intervention than self-compassion. The expected changes in physiological arousal were also not observed in response to priming. It could be that, as this was a written task, self-critical individuals responded as if they were being evaluated, which may account for the overall pattern of increased arousal across both groups, although interestingly the securely primed group did show decreasing heart rate over time.

The hypothesised beneficial effect of the attachment priming on subsequent loving-kindness meditation was mainly not supported. The overall pattern of results (see Table K11) suggests that in variables where the attachment priming had an effect, this effect did not transfer on into the loving-kindness meditation or even that the loving-kindness meditation had a negative effect (e.g. state attachment security). This could be explained as a "saturation" or "ceiling effect" - it is possible that for some variables, self-critical individuals may react against "too much of a good thing," perhaps with initial activation of positive schemas which then arouse fear and are defensively attacked (see discussion of trait variables). Alternatively, it may be that the length of time elapsed doing similar visualization exercises in a group of people who were not

experienced meditators may have led to loss of focus and possibly negative rumination, whereas in the neutral group the priming exercise may have been sufficiently different from the meditation to not provoke this response.

In the case of state attachment anxiety, the securely primed group does appear to have experienced greater reductions than the neutral group in response to the meditation, although there were no significant effects observed at the priming stage. Attachment research and theory (e.g. Ainsworth, Blehar, Waters & Wall, 1978) suggests that attachment anxiety is rooted in inconsistent care, therefore it may be that there was a “delayed effect” for this variable, meaning that it responded to the consistency of two security-enhancing interventions even though this seems to have amounted to “overkill” for other variables.

The results for the physiological variables are interesting in that both groups show increases in arousal from baseline during priming but this is followed by a reduction from baseline during meditation, with a greater reduction for the securely primed group for skin conductance and a greater reduction for the neutral group for heart rate. It is possible that this may also represent a “delayed effect” of the priming for this skin conductance, which is not observed for heart rate because skin conductance is related purely to the sympathetic nervous system whereas heart rate is also influenced by the parasympathetic system (Berntson, Cacioppo & Quigley, 1993). This could imply an eventual greater reduction of threat arousal systems in the securely primed group but not necessarily a greater activation of soothing systems.

In a number of variables (e.g. self-criticism, self-compassion, state attachment security, state attachment avoidance, skin conductance), loving-

kindness meditation appeared to benefit the neutrally-primed group. This might suggest that, contrary to previous research and theory (e.g. Duarte, McEwan, Barnes, Gilbert & Maratos, 2014), self-critical people may be able to benefit directly from an exercise designed to stimulate self-compassion rather than experiencing this as a threat.

Study limitations.

Sample. This study was carried out with a non-clinical sample therefore any conclusions for clinical practice should be treated with caution, although their average "inadequate self" self-criticism score approached levels measured in a small group of mental health service users. (See previous discussion of inclusion criteria in "Participants and recruitment" section). Despite this, however, there are limitations to the generalisability of a student sample who are likely to differ from a clinical population both in terms of co-morbidities and socio-economic status. Also, the "hated self" aspect of self-criticism may be the key feature in clinical populations and may be less prominent in a student sample. There was a need to balance appropriate recruitment criteria with the requirement to obtain an adequate sample size.

Measures. There were problems with psychometric properties of some of the questionnaire measures, as noted in previous sections. The visual analogue scale ratings, although based on validated measures, rely on only one rating per time point. In future it might be better to try to include additional ratings, although the need for detailed assessment has to be balanced against the need to limit measurement burden and testing time and also the fact that the effects of "one-off" priming are known to be relatively shortlived (e.g. Carnelly & Rowe, 2007). The study might also have benefited from differentiating different

types of avoidant attachment, in line with propositions from the literature (e.g. Bartholomew & Horowitz, 1991), which may have helped to elucidate trait variable associations.

Materials/stimuli. The primes used were written exercises so participants in the secure group were aware that they were being asked to think about a relationship, whereas some evidence suggests that implicit priming may be more effective as it does not trigger so much aversion or resistance in insecurely attached individuals. For example, Mikulincer, Shaver and Rom (2011) found that implicit security priming had a beneficial effect on problem-solving abilities regardless of attachment insecurity, whereas effects of explicit security priming were moderated by attachment anxiety and avoidance. As noted above, written exercises may also have triggered evaluative responses, even though instructions stated that there were “no right or wrong answers.” The self-compassion induction exercise used, the loving-kindness meditation, although again based on previous research (e.g. Kirschner, Kuyken & Karl, 2013), is only one example of possible exercises which can be used to induce self-compassion.

Design. It is possible that the study mostly failed to detect a beneficial effect of the loving-kindness meditation in the securely –primed group because they had already received a security-enhancing intervention: i.e. that the observed “ceiling effect” is a design artefact. However there was a theoretical rationale for conducting the study in this way as the attachment system is assumed to precede the development of internal working models of the self, and this could be addressed in future research (see below). The study also only looked at the interventions on a “one-off basis”, whereas a more realistic clinical

paradigm would be to look at repeated exposures, especially as previous research has found that repeated priming increases the duration of any priming effects (Carnelly & Rowe, 2007).

Study strengths.

This study addressed a theoretical and experimental gap in previous research by investigating self-compassion and self-criticism in relation to attachment manipulations. Gilbert's "three systems" model (e.g. Gilbert, 2009) is predicated on a relationship between self-soothing and affiliation systems, to which this study lends support. Additionally, much previous research on attachment priming has tended to focus on externally-directed attitudes and behaviours, whereas this research focuses on internal effects. The study also used physiological data in addition to pure self-report measures to help avoid bias arising through demand characteristics, and adds to the impetus for further consideration of the varying impacts of different forms of self-compassion training.

Clinical, theoretical and research implications.

The results of this study suggest that attachment priming may be of value in increasing feelings of security and self-compassion in some self-critical people. Falconer et al. (2014) suggests that an "indirect" experience of self-compassion may be beneficial in those who feel undeserving and therefore tend to block direct invitations to channel compassion towards the self. However, further research in clinical populations is needed and there are important caveats, in that the form of attachment priming used in this study depends on bringing to mind a specific attachment relationship. In clinical cases of severe trauma and neglect there may never have been such a relationship, or there

may be negative associations e.g. grief if the person has died. In such circumstances it may be more appropriate to use forms of implicit attachment priming which are less reliant on specific relationships. Alternatively, it may be that the results of this study provide some tentative empirical support for compassion practices such as the creation of a “perfect nurturer” (Lee, 2005), a specific but imaginary attachment figure. It may also be that compassion practices such as loving-kindness meditation are of value with some self-critical people, but that they should be kept relatively short and not necessarily combined with other practices within the same session.

Theoretically, this research lends some support to the idea that the relationship to the self is fundamentally linked to relationships with others, which are likely to have been influenced by early attachment experiences. It also implies that compassion practices may not always be aversive to self-critical individuals. However, further research is needed due to the limitations of the present study. Possible future work could include replication with a clinical sample, counterbalancing the order of the primes and compassion-induction procedures to determine whether there is a differential in effectiveness, comparing implicit with explicit priming, looking at longer-term effects if the procedure is repeated multiple times, and qualitative analysis e.g. looking at the content of written priming responses or interviewing participants on their experience of the procedures used.

Conclusion

The current study investigated the effects of attachment priming and neutral priming on self-critical individuals subsequently exposed to a loving-kindness meditation. Some evidence was found for beneficial effects of attachment priming, but this benefit mostly did not persist in subsequent exposure to loving-kindness meditation. Individuals not receiving attachment priming, however, showed some benefits from loving-kindness meditation. This study may suggest that attachment priming could be used as a clinical intervention to help enhance self-compassion and a sense of safety, although it did not decrease self-criticism or arousal. Future research should attempt to address some of the limitations of this work to gain a clearer picture of its potential merits as a clinical tool.

References

Ainsworth, M. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Erlbaum.

Baldwin, M., Keelan, J., Fehr, B., Enns, V., & Koh-Rangarajoo (1996). Social-cognitive conceptualisation of attachment working models: Availability and accessibility effects. *Journal of Personality and Social Psychology, 71*, 94-109.

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*, 226–244.

Berntson, G.G., Bigger, J.T., Eckberg, D.L., Grossman, P., Kaufmann, P.J., Malik, M., …van der Molen, M.W. (1997). Heart rate variability: Origins, methods and interpretive caveats. *Psychophysiology, 34*, 623-648.

Berntson, G. G., Caciopp, J.T., & Quigley, K. S. (1993). Cardiac psychophysiology and autonomic space in humans: Empirical perspectives and conceptual implications. *Psychological Assessment, 114*, 269-322.

Berntson G. G., Quigley K. S., Jang J., and Boysen S. T. (1990). An approach to artifact identification: Application to heart period data. *Psychophysiology, 27* 586–598.

Berntson G. G., & Stowell J.R. (1998). ECG artifacts and heart period variability: Don't miss a beat! *Psychophysiology, 35*, 127–132.

Bowlby, J. (1969). *Attachment and loss, Vol. 1: Attachment.* New York, NY: Basic Books.

Breines, J., & Chen, S. (2013). Activating the inner caregiver: The role of support-giving schemas in increasing state self-compassion. *Journal of Experimental Social Psychology, 49*, 58-64.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult romantic attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), Attachment theory and close relationships (pp. 46–76). New York: Guilford.

Carnelly, K. B., & Rowe, A. C. (2007). Repeated priming of attachment security influences later views of self and relationships. *Personal Relationships, 14*, 307-20.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* New Jersey: Lawrence Erlbaum Associates.

Duarte, J., McEwan, K., Barnes, C., Gilbert, P., & Maratos, F. (2014). Do therapeutic imagery practices affect physiological and emotional indicators of threat in high self-critics? *Psychology and Psychotherapy*: *Theory, Research and Practice, 28*, 1-12.

Falconer, C., Slater, M., Rovira, A.,King, J., Gilbert, P., Antley, A., & Brewin, C. (2014). Embodying compassion: A virtual reality paradigm for overcoming excessive self-criticism. *Public Library Of Science ONE*, 9, 1-7.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

Figner, B., & Murphy, R. O. (2011). Using skin conductance in judgment and decision making research. In Schulte-Mecklenbeck, M., Kuehberger, A., & Ranyard, R. (Eds.), A handbook of process tracing methods for decision research. (pp.163-185). New York, NY: Psychology Press.

Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, *78*, 350-365.

Gilbert, P. (2005). Compassion and cruelty: A biopsychosocial approach. In Gilbert, P. (Ed.), *Compassion: Conceptualisations, research and use in psychotherapy* (pp. 9-74). Hove: Routledge.

Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment, 15,* 199-208.

Gilbert, P. (2014). Attachment theory and compassion focused therapy for depression. In Danquah, A., & Berry, K. (Ed.), *Attachment theory in adult mental health: A guide to clinical practice* (pp. 35-48). London: Routledge

Gilbert, P., Clark, M., Hempel, S., Miles, J.N.V. & Irons, C. (2004) Criticising and reassuring oneself: An exploration of forms, styles and reasons in female students. *British Journal of Clinical Psychology*, *43*, 31-50.

Gilbert, P., McEwan, K., Catarino, F., Baiao, R., & Palmeria, L. (2014). Fears of happiness and compassion in relationship with depression, alexithymia,

and attachment security in a depressed sample. *British Journal of Clinical Psychology, 53*, 228-244.

Gilbert, P., McEwan, K., Matos, M., & Rivis, A. (2010). Fears of compassion: Development of three self-report measures. *Psychology and psychotherapy*, *84*, 239-255.

Gillath, O., Hart, J., Noftle, E. E., & Stockdale, G. D. (2009). Development and validation of a state adult attachment measure (SAAM). *Journal of Research in Personality*, *43*, 362-373.

Gillath, O., Selcuk, E., & Shaver, P.R. (2008). Moving toward a secure attachment style: Can repeated security priming help? *Social and Personality Psychology Compass, 2,* 1651-1666.

Karl, A., Arikan, G., Stopa, L., Baldwin, D., Heinrichs, M., & Carnelly, K. (2015). Can priming secure attachment in combination with oxytocin reduce physiological arousal to trauma films and present intrusions? To be submitted for publication

Kirschner, H., Kuyken, W. & Karl, A. (2013). Compassion for the self: Psychophysiological correlates of a new concept. *Psychophysiology, 50*, Supplement S39.

Kroenke, K., Spitzer, R. L., Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16,* 606-613.

Kupeli, N., Chilcot, J., Schmidt, U.H., Campbell, I.C., & Troop, N.A. (2012). A confirmatory factor analysis and validation of the Forms of Self-

criticism/Self-reassurance Scale. *British Journal of Clinical Psychology*. In press.

Lee, D. (2005). The perfect nurturer: A model to develop a compassionate mind within the context of cognitive therapy. In Gilbert, P. (Ed.), Compassion: Conceptualisations, research and use in psychotherapy (pp. 9-74). Hove: Routledge.

Longe, O., Maratos, F. A., Gilbert, P., Evans, G., Volker, F., Rockliff, H., & Rippon, G. (2010). Having a word with yourself: neural correlates of self-criticism and self-reassurance. *NeuroImage*, *49*, 1849-1856.

Lykken, D., Rose, R., Luther, B., & Maley, M. (1966). Correcting psychophysiological measures for individual differences in range. *Psychological Bulletin, 66*, 481-484.

Mikulincer, M., & Shaver, P.R. (2005). Attachment security, compassion and altruism. *Current Directions in Psychological Science, 14*, 34-38.

Mikulincer, M., & Shaver, P. R. (2007). Boosting attachment security to promote mental health , prosocial values, and inter-group tolerance. *Psychological Inquiry*, *18*, 139-156.

Mikulincer, M., Shaver, P.R., & Rom, E. (2011). The effects of implicit and explicit security priming on creative problems solving*. Cognition and Emotion, 25*, 519-531.

Neff, K. (2003). Self-compassion : An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, *2,* 85-101.

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*, 223-250.

Neff, K.D. (2011). Self-compassion, self-esteem and wellbeing. *Social and Personality Psychology Compass, 5*, 1-12.

Neff, K. D., & McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity*, *9*, 225-240.

Noelen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion, 7,* 561-70.

Norman, L., Lawrence, N., Iles, A., & Karl, A. (2014). Trait and primed attachment security attenuate threat related amygdala reactivity to both facial and linguistic threat cues. To be submitted for publication.

Rockliff, H., Gilbert, P., McEwan, K., Lightman, S., & Glover, D. (2008). A pilot exploration of heart rate variability and salivary cortisol responses to compassion-focused imagery. *Clinical Neuropsychiatry*, *5*, 132-139.

Rowe, A., & Carnelley, K. (2003). Attachment style differences in the processing of attachment-relevant information: Primed-style effects on recall, interpersonal expectations and affect. *Personal Relationships, 10*, 59-75.

Sibley, C. G., & Liu, J. H. (2004). Short-term temporal stability and factor structure of the revised experiences in close relationships (ECR-R) measure of adult attachment. Personality and Individual Differences, 36, 969-975.

Solem, K.; Laguna P., & Sörnmo, L. (2006). An Efficient Method for Handling Ectopic Beats Using the Heart Timing Signal. IEEE Transactions on *Biomedical Engineering, 53*, 13-20.

Tabachnick, B., & Fidell, L. (2013). *Using multivariate statistics.* London: Pearson.

Tukey, J. W. (1977). *Exploratory data analysis.* London: Pearson.

Williams, M., Dalgleish, T., Karl, A., & Kuyken, W. (2014). Examining the factor structure of the five facet mindfulness questionnaire and the self-compassion scale. *Psychological Assessment, 26*, 407-418.

Appendix A: Sample Size and Power Calculations

The power calculation for Hypothesis 1 is based on Gilbert, McEwan, Matos & Rivis (2011) who found medium to large effect sizes for correlations between fear of self-compassion, self-coldness and attachment insecurity. For 80% power, with a large effect size of r = .4, alpha of .05, 37 participants were required. This was calculated using "G*Power3" software (Faul, Erdfelder, Buchner & Lang, 2009). The sample in Gilbert et al., 2011, were students (n = 222) not pre-selected for high levels of self-criticism, hence the expectation is that a large effect size is even more likely in a self-critical sample.

The power calculation for Hypotheses 2 and 3 is based on the Karl et al. (2013) study of secure attachment priming and response to trauma films. The variable used to determine the effect size relates to the state felt security increase in the securely primed versus the neutrally primed group. For 80% power, with a large effect size of .123 (partial eta square for a 2 x 2 mixed ANOVA, group by time) alpha of .05, 44 participants were required. This was calculated using "G*Power3" software (Faul et al., 2009).

Achieved Power

Effect sizes achieved for the correlation analyses in this sample of 49 individuals ranged from between r = *.265* (very small) to r = .552 (large) and the achieved statistical power ranged from 15% to 94%. This indicates that it was possible to detect moderate to large but not small to moderate effects with this sample. Post-hoc power calculations revealed that in order to achieve a significant effect for the r = .265 (small) effect at p = .002 (to control for multiple testing) 188 participants would have been required, and to achieve a significant

effect for r = .423 (moderate non-significant effect in this sample), 68 participants would have been needed.

Effect sizes achieved for main hypothesised group by time interactions (state felt reductions in self-criticism and increases in self-compassion) ranged from ηp^2 = .060 (medium) to ηp^2 = .114 (large) and the achieved statistical power was around 99% in all cases. Post-hoc power calculations revealed that in order to achieve a significant effect for a ηp^2 = .010 at p = .05, 138 participants would have been required.

Appendix B: Ethics Letter of Approval

From: apache@exeter.ac.uk <apache@exeter.ac.uk> on behalf of Ethics Approval System <D.M.Salway@exeter.ac.uk>
Sent: 02 June 2014 11:01
To: Roy, Amaryllis
Subject: Your application for ethical approval (2014/552) has been accepted

Ethical Approval system

Your application (2014/552) entitled Self-compassion and attachment priming: Does security priming aid self-compassion and reduce fear of self-compassion in self-critical individuals? has been accepted
Please visit http://www.exeter.ac.uk/staff/ethicalapproval/
Please click on the link above and select the relevant application from the list.

Appendix C: Measures

Forms of Self-Criticising and Self-Reassuring Scale (FSCRS)

This is a 22-item scale which measures self-criticism and the ability to self-reassure at times of difficulty. The items make up three components: there are two forms of self-criticism; inadequate self, which focuses on a sense of personal inadequacy (e.g. I am easily disappointed with myself), and hated self, which measures the desire to hurt or persecute the self (e.g. I have become so angry with myself that I want to hurt or injury myself), and one form of self-reassurance, (e.g. I am able to remind myself of positive things about myself). The responses are given on a 5-point Likert scale (ranging from 0 = not at all like me, to 4 = extremely like me). Gilbert et al. (2004) report Cronbach alphas of .90 for inadequate self and .86 for hated self and reassured self respectively. Kupeli, Chilcot, Schmidt, Campbell & Troop (2012) report good reliability and validity for the scale.

THE FORMS OF SELF-CRITICISING/ATTACKING & SELF-REASSURING SCALE (FSCRS)

When things go wrong in our lives or don't work out as we hoped, and we feel we could have done better, we sometimes have *negative and self-critical thoughts and feelings*. These may take the form of feeling worthless, useless or inferior etc. However, people can also try to be supportive of themselves. Below are a series of thoughts and feelings that people sometimes have. Read each statement carefully and circle the number that best describes how much each statement is true for you. Please use the scale below:

Not at all like me 0	A little bit like me 1	Moderately like me 2	Quite a bit like me 3	Extremely like me 4

When things go wrong for me:

1.	I am easily disappointed with myself.	0	1	2	3	4
2.	There is a part of me that puts me down.	0	1	2	3	4
3.	I am able to remind myself of positive things about myself.	0	1	2	3	4
4.	I find it difficult to control my anger and frustration at myself.	0	1	2	3	4

5.	I find it easy to forgive myself.	0	1	2	3	4
6.	There is a part of me that feels I am not good enough.	0	1	2	3	4
7.	I feel beaten down by my own self-critical thoughts.	0	1	2	3	4
8.	I still like being me.	0	1	2	3	4
9.	I have become so angry with myself that I want to hurt or injure myself.	0	1	2	3	4
10.	I have a sense of disgust with myself.	0	1	2	3	4
11.	I can still feel lovable and acceptable.	0	1	2	3	4
12.	I stop caring about myself.	0	1	2	3	4
13.	I find it easy to like myself.	0	1	2	3	4
14.	I remember and dwell on my failings.	0	1	2	3	4
15.	I call myself names.	0	1	2	3	4
16.	I am gentle and support-ive with myself.	0	1	2	3	4
17.	I can't accept failures and setbacks without feeling inade-quate.	0	1	2	3	4
18.	I think I deserve my self-criticism.	0	1	2	3	4
19.	I am able to care and look after myself.	0	1	2	3	4
20.	There is a part of me that wants to get rid of the bits I don't like.	0	1	2	3	4
21.	I encourage myself for the future.	0	1	2	3	4
22.	I do not like being me.	0	1	2	3	4

Fear of Compassion Scale (FoCS)

The measure of trait fear of self-compassion used was the 15-item "fear of compassion for self" subscale from the Fear of Compassion Scales, FoCS (Gilbert et al., 2011), which measures fear of compassion for self on a 0-4 Likert scale. In the study in which this measure was developed, Cronbach alphas for the fear of compassion for self subscale were .92 for a sample of students (*N* = 222) and .85 for a sample of therapists (*N* = 53).

Below are a series of statements that we would like you to think carefully about and then circle the number that best describes how each statement fits you.

0 Don't agree at all 1 2 3 4 Completely agree
Somewhat agree

I feel that I don't deserve to be kind and forgiving to myself

0 1 2 3 4

If I really think about being kind and gentle with myself it makes me sad

0 1 2 3 4

Getting on in life is about being tough rather than compassionate

0 1 2 3 4

I would rather not know what being kind and compassionate to myself feels like

0 1 2 3 4

When I try and feel kind and warm to myself I just feel kind of empty

0 1 2 3 4

I fear that if I start to feel compassion and warmth for myself, I will feel overcome with a sense of loss/grief

0 1 2 3 4

I fear that if I become kinder and less self-critical to myself then my standards will drop

0 1 2 3 4

I fear that if I am more self-compassionate, I will become a weak person

0 1 2 3 4

I have never felt compassion for myself, so I would not know where to begin to develop these feelings.

0 1 2 3 4

I worry that if I start to develop compassion for myself I will become dependent on it

0 1 2 3 4

I fear that if I become too compassionate to myself I will lose my self-criticism and my flaws will show

0 1 2 3 4

I fear that if I develop compassion for myself, I will become someone I do not want to be

0 1 2 3 4

I fear that if I become too compassionate to myself, others will reject me

0 1 2 3 4

I find it easier to be critical towards myself rather than compassionate

0 1 2 3 4

I fear that if I am too compassionate towards myself, bad things will happen

0 1 2 3 4

Experiences in Close Relationships Scale (ECRS)

This is a 36-item self-report measure with a seven-point Likert scale, 18 items are used to compute a score for attachment avoidance, and the other 18 items give a score for attachment anxiety. Estimates of internal consistency are reported as usually within the region of .90 (Fraley, Waller & Brennan, 2000), with good reliability, particularly at the insecure end of the dimensions. See also Sibley & Liu (2004).

Scale:
The statements below concern how you feel in emotionally intimate relationships. We are interested in how you *generally* experience relationships, not just in what is happening in a current relationship. Respond to each statement by circling a number to indicate how much you agree or disagree with the statement.

1=Strongly Disagree……7=Strongly Agree

1. I'm afraid that I will lose my partner's love.
1 2 3 4 5 6 7

2. I often worry that my partner will not want to stay with me.
1 2 3 4 5 6 7

3. I often worry that my partner doesn't really love me.
1 2 3 4 5 6 7

4. I worry that romantic partners won't care about me as much as I care about them.
1 2 3 4 5 6 7

5. I often wish that my partner's feelings for me were as strong as my feelings for him or her.
1 2 3 4 5 6 7

6. I worry a lot about my relationships.
1 2 3 4 5 6 7

7. When my partner is out of sight, I worry that he or she might become interested in someone else.
1 2 3 4 5 6 7

8. When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.
1 2 3 4 5 6 7

9. I rarely worry about my partner leaving me.
1 2 3 4 5 6 7

10. My romantic partner makes me doubt myself.
1 2 3 4 5 6 7

11. I do not often worry about being abandoned.
1 2 3 4 5 6 7

12. I find that my partner(s) don't want to get as close as I would like.
1 2 3 4 5 6 7

13. Sometimes romantic partners change their feelings about me for no apparent reason.
1 2 3 4 5 6 7

14. My desire to be very close sometimes scares people away.
1 2 3 4 5 6 7

15. I'm afraid that once a romantic partner gets to know me, he or she won't like who I really am.
1 2 3 4 5 6 7

16. It makes me mad that I don't get the affection and support I need from my partner.
1 2 3 4 5 6 7

17. I worry that I won't measure up to other people.
1 2 3 4 5 6 7

18. My partner only seems to notice me when I'm angry.
1 2 3 4 5 6 7

19. I prefer not to show a partner how I feel deep down.
1 2 3 4 5 6 7

20. I feel comfortable sharing my private thoughts and feelings
1 2 3 4 5 6 7

21. I find it difficult to allow myself to depend on romantic partners.
1 2 3 4 5 6 7

22. I am very comfortable being close to romantic partners.
1 2 3 4 5 6 7

23. I don't feel comfortable opening up to romantic partners.
1 2 3 4 5 6 7

24. I prefer not to be too close to romantic partners.
1 2 3 4 5 6 7

25. I get uncomfortable when a romantic partner wants to be very close.
1 2 3 4 5 6 7

26. I find it relatively easy to get close to my partner.
1 2 3 4 5 6 7

27. It's not difficult for me to get close to my partner.
1 2 3 4 5 6 7

28. I usually discuss my problems and concerns with my partner.
1 2 3 4 5 6 7

29. It helps to turn to my romantic partner in times of need.
1 2 3 4 5 6 7

30. I tell my partner just about everything.
1 2 3 4 5 6 7

31. I talk things over with my partner.
1 2 3 4 5 6 7

32. I am nervous when partners get too close to me.
1 2 3 4 5 6 7

33. I feel comfortable depending on romantic partners.
1 2 3 4 5 6 7

34. I find it easy to depend on romantic partners.
1 2 3 4 5 6 7

35. It's easy for me to be affectionate with my partner.
1 2 3 4 5 6 7

36. My partner really understands me and my needs.
1 2 3 4 5 6 7

Scoring Information: The first 18 items above comprise the attachment-related anxiety scale. Items 19 – 36 comprise the attachment-related avoidance scale. *In real research, the order in which these items are presented should be randomized.* To obtain a score for attachment-related *anxiety*, please average a person's responses to items 1 – 18. However, because items 9 and 11 are "reverse keyed" (i.e., high numbers represent low anxiety rather than high anxiety), you'll need to reverse the answers to those questions before averaging the responses. (If someone answers with a "6" to item 9, you'll need to re-key it as a 2 before averaging.) To obtain a score for attachment-related *avoidance*, please average a person's responses to items 19 – 36. Items 20, 22, 26, 27, 28, 29, 30, 31, 33, 34, 35, and 36 will need to be reverse keyed before you compute this average.

Self Compassion Scale

This is a 26-item measure using a five-point Likert scale, and is subdivided into six subscales, self-kindness, self-judgement, common humanity, isolation, mindfulness and over-identification. Good test-retest reliability was obtained in Neff's (2003) study: overall test-retest correlation was .93 (*N*=232). However, see Williams, Dalgleish, Karl & Kuyken, 2014, for a discussion of poor psychometric properties of the full scale, hence in this study the self-kindness subscale alone was used.

Self Compassion Scale (Neff, 2003)

To all interested, please feel free to use the Self-Compassion Scale for research or use with any other population. It is appropriate for ages 14 and up (as long as individuals have at least an 8th grade reading level). If you aren't that interested in using the subscales, you might also want to consider using the Short SCS (12 items), which has a near perfect correlation with the long scale.

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Coding Key:
Self-Kindness Items: 5, 12, 19, 23, 26
Self-Judgment Items: 1, 8, 11, 16, 21
Common Humanity Items: 3, 7, 10, 15
Isolation Items: 4, 13, 18, 25
Mindfulness Items: 9, 14, 17, 22
Over-identified Items: 2, 6, 20, 24

Subscale scores are computed by calculating the mean of subscale item responses. To compute a total self-compassion score, reverse score the negative

subscale items - self-judgment, isolation, and over-identification (i.e., 1 = 5, 2 = 4, 3 = 3. 4 = 2, 5 = 1) - then compute a total mean.

(This method of calculating the total score is slightly different than that used in the article referenced above, in which each subscale was added together. However, I find it is easier to interpret the scores if the total mean is used.)

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				Almost always
1	2	3	4	5

_____ 1. I'm disapproving and judgmental about my own flaws and inadequacies.

_____ 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____ 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

_____ 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

_____ 5. I try to be loving towards myself when I'm feeling emotional pain.

_____ 6. When I fail at something important to me I become consumed by feelings of inadequacy.

_____ 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

_____ 8. When times are really difficult, I tend to be tough on myself.

_____ 9. When something upsets me I try to keep my emotions in balance.

_____ 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____ 11. I'm intolerant and impatient towards those aspects of my personality I don't like.

_____ 12. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____ 13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____ 14. When something painful happens I try to take a balanced view of the situation.

_____ 15. I try to see my failings as part of the human condition.

_____ 16. When I see aspects of myself that I don't like, I get down on myself.

_____ 17. When I fail at something important to me I try to keep things in perspective.

_____ 18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.

_____ 19. I'm kind to myself when I'm experiencing suffering.

_____ 20. When something upsets me I get carried away with my feelings.

_____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 23. I'm tolerant of my own flaws and inadequacies.

_____ 24. When something painful happens I tend to blow the incident out of proportion.

_____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

Patient Health Questionnaire (PHQ-9)

The Patient Health Questionnaire (PHQ-9) is a widely used nine-item screening tool for depression, internal consistency has been demonstrated in the region of .86 to .89 (Kroenke, Spitzer & Williams, 2001).

PHQ- 9

	Over the last 2 weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly every day
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
3	Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9	Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

A11 – PHQ9 total score ☐

Appendix D: Visual Analogue Scales

0----------100

I don't feel at all self-critical — **I feel very self-critical**

0----------100

I don't feel like being kind and understanding towards myself at all — **I feel like being very kind and understanding towards myself**

0----------100

I don't feel loved and safe at all — **I feel very loved and safe**

0----------100

I don't have a strong need to feel loved — **I really need to feel loved**

0----------100

The idea of being emotionally close to someone doesn't make me nervous at all — **The idea of being emotionally close to someone makes me very nervous**

Appendix E: Primes

Attachment Prime

Participant Number:

Visualization Task

We now want you to complete a visualization task.

Please think about a relationship you have had in which you have found that it was relatively easy to get close to the other person and you felt comfortable depending on the other person. In this relationship you didn't often worry about being abandoned by the other person and you didn't worry about the other person getting too close to you. It is crucial that the nominated relationship is important and meaningful to you.

1. What is the nature of the relationship (e.g., romantic partner, friend, parent, roommate)?

2. How long have you known this person? Please indicate in years and (if applicable) months.

Now, take a moment and try to get a visual image in your mind of this person. What does this person look like? What is it like being with this person? You may want to remember a time when you were actually with this person. What would he or she say to you? What would you say in return? What does this person mean to you? How do you feel when you are with this person? How would you feel if this person was here with you now?

Please jot down your thoughts in the space provided below. You will have 10 minutes to complete this task. The experimenter will let you know when the 10 minutes are up. Remember that there are no wrong or right answers, so feel free to write anything down. If you finish before the 10 minutes are up, please continue to think about the relationship and write down anything else that comes to mind about the relationship.

Please ask now if you have any questions, if not please begin.

Neutral Prime

Participant Number:

Visualization Task

We now want you to complete a visualisation task.

We are interested in how people feel after thinking about particular topics. We would like you to write for 10 minutes about a supermarket scenario. Try to think of a particular time that you visited a supermarket to do a large or weekly shop and give information about the sequence of events that you completed as you moved around the store. For example, you may have selected a trolley and walked down the first aisle, picking up items as you went. Please try to give as much detail as possible about what you picked up or looked at, i.e., did you have to weigh an item or did you have to reach up to a top shelf?

Please jot down your thoughts in the space provided. You will have 10 minutes to complete this task. The experimenter will let you know when the 10 minutes are up. Remember that there are no wrong or right answers, so feel free to write anything down. If you finish before the ten minutes are up, please continue to think about the scenario and write down anything else that comes to mind.

Please ask now if you have any questions, if not please begin.

Appendix F: Loving Kindness Meditation Script

You will now be guided through an exercise with the purpose of bringing warmth and good will into your life. Sit in a comfortable position, reasonably upright and relaxed (pause for 2 sec). Close your eyes fully or partly (pause for 2 sec). Take a few deep breaths to settle into your body and into the present moment (pause for 3 sec).

Bring to mind a person or other living being who naturally makes you smile. This could be a child, your grandmother, your cat or dog - whoever naturally brings happiness to your heart. Perhaps it's a bird outside your window. Let yourself feel what it's like to be in that being's presence (pause for 2 sec). Allow yourself to enjoy the good company.

(Pause)

Now, recognize how vulnerable this loved one is--just like you, subject to sickness, aging, and death. Also, this being wishes to be happy and free from suffering, just like you and every other living being. Repeat softly and gently, feeling the importance of your words:

May you be safe.

May you be peaceful.

May you be healthy.

May you live with ease.

(Pause)

May you be safe.

May you be peaceful.

May you be healthy.

May you live with ease.

(Pause)

When you notice that your mind has wandered, return to the words and the image of the loved one you have in mind. Savour any warm feelings that may arise. Go slow.

(Pause)

Now add yourself to your circle of good will. Put your hand over your heart and feel the warmth and gentle pressure of your hand (for just a moment or for the rest of the excercise), saying:

May you and I be safe.

May you and I be peaceful.

May you and I be healthy.

May you and I live with ease.

(Pause)

May you and I be safe.

May you and I be peaceful.

May you and I be healthy.

May you and I live with ease.

(Pause)

Visualize your whole body in your mind's eye, notice any stress or uneasiness that may be lingering within you, and offer kindness to yourself.

May I be safe.

May I be peaceful.

May I be healthy.

May I live with ease.

Repeat the phrases inwardly with enough space between them so that they are pleasing you. Gather all your attention behind one phrase at a time. (Pause)

If you find your attention wandering, don't worry. You can simply let go of distractions and begin again.

May I be safe.

May I be peaceful.

May I be healthy.

May I live with ease.(Pause)

Feelings, thoughts, or memories may come and go; allow them to arise and pass away. Let the anchor be the repetition of this traditional phrases:

May I be safe.

May I be peaceful.

May I be healthy.

May I live with ease.(Pause)

Just rest and sit quietly in your own body, savoring the good will and compassion that flows naturally from your own heart. Know that you can return to the phrases anytime you wish.

(Pause for 15 sec)

Gently open your eyes.

Appendix G: Distraction Task

For the next few minutes, try your best to focus your attention on each of the ideas on the following pages.

Read each item slowly and silently to yourself. As you read the items, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments visualising and concentrating on each item.

Please continue until the experimenter returns.

Think about:

and imagine a boat slowly crossing the Atlantic

Think about:

the layout of a typical classroom

Think about:

the shape of a large black umbrella

Think about:

the movement of an electric fan on a warm day

Think about:

raindrops sliding down a window pane

Think about:

a double-decker bus driving down a street

Think about:

and picture a full moon on a clear night

Think about:

clouds forming in the sky

Think about:

the layout of the local shopping centre

Think about:

and imagine a plane flying overhead

Think about:

fire darting round a log in a fire-place

Think about:

and concentrate on the expression on the face of the *Mona Lisa*

Think about:

the car park at a large supermarket

Think about:

two birds sitting on a tree branch

Think about:

the shadow of a stop sign

Think about:

the layout of the local post office

Think about:

the structure of a high-rise office building

Think about:

and picture the Eiffel Tower

Think about:

and imagine a lorryload of apples

Think about:

the pattern on an Oriental rug

Think about:

the ‘man in the moon’

Think about:

the shape of the continent of Africa

Think about:

a band playing outside

Think about:

a group of polar bears fishing in a stream

Think about:

the shape of Sydney Opera House

Think about:

the shape of Great Britain

Think about:

the way Stonehenge looks at sunset

Think about:

the outline of the Houses of Parliament

Think about:

a train stopped at a station

Think about:

a lone cactus in the desert

Think about:

the shape of the country Italy

Think about:

a row of shampoo bottles on display

Think about:

a petrol station on a major road

Think about:

the fuzz on the shell of a coconut

Think about:

the queens' head on a stamp

Think about:

a band playing the National Anthem

Think about:

the shape of a cello

Think about:

the shape of the United States of America

Think about:

the baggage claim area at the airport

Think about:

the size of the Statue of Liberty

Think about:

the shape of a cricket bat

Think about:

a freshly painted door

Think about:

the shiny surface of a trumpet

Appendix H: Study Information and Consent Form

Participant Information Sheet

Principal Researcher: Amaryllis Roy
Supervisor: Dr Anke Karl

Self-criticism and response to emotional tasks

Thank you for your interest in participating in my research. Please read the following information carefully to help you to decide whether to take part.

Purpose of the study

This study is being conducted by Amaryllis Roy, Trainee Clinical Psychologist as part of the Doctorate in Clinical Psychology programme. The aim of the study is to look at the association between being critical with oneself and a person's emotional responses to some imagery and audio tasks. This should help us to understand how self-criticism can sometimes hinder people from benefiting from psychological therapies. It is hoped that the information from this study may suggest possible ways of guiding individuals in addressing their own critical inner voice.

What does participation involve?

Before taking part in the study you will be asked to answer some questions about yourself. All the information you provide about yourself is confidential; the only exception to this is if there is a significant concern for your safety or someone else's. In this case university wellbeing services, your GP or emergency services may have to be informed.

Based on the outcome of the information you provide about yourself, you may then be invited to come to a laboratory in the Washington Singer Building at the University of Exeter, to complete some questionnaires and to undertake some tasks. One of the tasks will involve writing, the other will require you to listen to and try to follow some audio instructions.

Whilst you are doing these tasks a machine will read your heart rate from small attachments to your chest beneath your ribcage and just below your collar bone, and the electrical conductivity of your skin will be measured by attachments to your fingers. Additionally brain response will be measured by leads mounted on a cap. This is to measure changes in your level of physiological arousal. The attachments are not invasive (they do not go inside your body) they are not harmful or painful in any way, and can be removed in less than a minute. The cap on your head has to be attached with gel, but facilities are available for you to wash your hair afterwards. We advise participants not to wear makeup or hair products as this can affect the conductivity of the electrodes attached to the cap.

The whole procedure will last about one hour to an hour and a half. All your personal details will remain confidential and secure, the reported results of the research will only include non-identifying information about participants (e.g. age, gender).

Remuneration

To thank you for your time in taking part in this study you will receive course credits if you are a current undergraduate of the University of Exeter.

Are there any risks in taking part?

Participating in this research will involve you giving up your time, completing some questionnaires and participating in some tasks. The questionnaires and tasks have been widely used with different groups of people and some participants find them pleasant, others find them boring, others do not enjoy them or find them temporarily unsettling. We are interested in your own unique response. In the unlikely event that you find the questionnaires or tasks unpleasant or upsetting, you will be given the opportunity at the end of the procedure to discuss any difficult feelings with the researcher and you will be signposted to further help if needed.

What are the possible benefits of taking part?

There are no direct advantages for you. However, the findings of this study may help to improve psychological therapies. If you decide to take part, we also hope that you will find the experience interesting and enjoyable.

Confidentiality and withdrawal of data

All study results (data) will be anonymised and securely stored electronically at the University of Exeter. The study findings will be written up and reported (a thesis) in part completion of a Doctorate in Clinical Psychology. In accordance with University of Exeter Open Research Exeter policy, the thesis will be stored electronically at the University of Exeter, and will be accessible online (open access). The study findings might also be written up for publication in research journals and presented at conferences. The published journal article will also be available online (open access, University of Exeter). These research reports and presentations will not contain any identifiable information about you.

Participation in the study is entirely voluntary and you can decide to withdraw from the study at any time and without giving a reason.

What if there is a problem?

If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated during the course of this study, you can contact the Study Supervisor, Dr Anke Karl (details below).

Contact information

If you require further information please contact the Principal Researcher:

Principal Researcher
Amaryllis Roy
Washington Singer Laboratories
Perry Road
University of Exeter
EX4 4QG
ar387@exeter.ac.uk

Project Supervisor
Anke Karl
Washington Singer Laboratories
Perry Road
University of Exeter
EX4 4QG
a.karl@exeter.ac.uk

Consent Form

Participant Consent Form

Name of researcher: Amaryllis Roy

1. I confirm that I have read and understood the information sheet for the study being conducted by the above researcher.
2. I understand that my personal details will be kept secure and no identifying details will be used as part of the research results.
3. I understand that any information I give about myself is confidential unless I divulge risk of harm to myself or others, in which case confidentiality may be breached.
4. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason.
5. I agree to take part in the study.

Name of participant:

Signature:

Date:

Appendix I: Debrief Form

Participant Debriefing Sheet

Principal Researcher: Amaryllis Roy

Supervisor: Dr Anke Karl

Self-compassion and attachment priming: Does security priming aid self-compassion and reduce fear of self-compassion in self-critical individuals?

Thank you for participating in this study. Your time and effort are much appreciated!

You have taken part in a study which investigates whether thinking about important relationships can help to promote self-compassion and reduce fear of self-compassion.

'**Self-compassion'** involves being kind to ourselves and not judging ourselves when we experience misfortune and personal failings. It involves an acceptance that such experiences will occur and that it is okay for them to occur, and an acknowledgment that we are not alone in experiencing them. Teaching self-compassion has been found to be beneficial in psychological therapies for a range of mental health issues.

Individuals who tend to be more self-critical may find it more difficult to be self-compassionate and may also be actively fearful of being self-compassionate, for example in case it leads to lowered standards.

'Attachment' is a behavioural system which helps ensure that infants and young children remain close to their caregivers. It is believed that adult humans have internalised models of relationships which are influenced by their early attachment experiences.

The first reason for carrying out this study was to see whether individual differences in general attachment style influence general levels of self-criticism and fear of self-compassion. Therefore, we asked you to answer some questionnaires.

The second reason was to find out whether helping someone to think about an attachment relationship could increase their ability to generate self-compassion and reduce self-criticism and fear of self-compassion 'in the moment', regardless of their general attachment style. Therefore we compared an 'attachment' prime with a 'neutral' prime to see if this affected responses to a loving-kindness meditation, which is an exercise designed to induce self-compassion.

It is hoped that this research will help to improve psychological therapies which attempt to induce greater self-compassion, in particular when working with

people who may find it more difficult to be compassionate to themselves due to adverse early experiences.

Contact details

If you would like further information, please contact the Principal Researcher using the contact details below:

Principal Researcher
Amaryllis Roy
Washington Singer Laboratories
Perry Road
University of Exeter
EX4 4QG

ar387@exeter.ac.uk

Appendix J: Data Cleaning

Data were checked for normality and unusual cases using the SPSS "Explore" function and inspection of boxplots, scatterplots, skewness, kurtosis and the Kolmorogov-Smirnoff test significance values. In order to retain all study participants, outlier scores were winsorized based on the interquartile range of each variable (Tukey, 1977), i.e. transformed to set data above the 95th percentile to the 95th percentile (Tabachnick & Fidell, 2013). This was done for two participants on FSCRS HS questionnaire, one participant on the PHQ-9 questionnaire, and one participant on the self-compassion visual analogue scale prior to priming. The following questionnaire variables were found to be non-normally-distributed: FSCRS HS questionnaire, FSCRS-IS questionnaire, ECRS avoidance questionnaire, PHQ-9 questionnaire and SCS self-kindness scale questionnaire, hence non-parametric tests were used (see below). Visual analogue scale state attachment variables (secure, avoidant and anxious) were also non-normally distributed at some time points and so these were analysed using non-parametric tests. Similarly there were normality violations for many time points of the physiological data variables, as well as multivariate outliers in some cases, hence non-parametric tests were used. Three cases (6% of sample) were excluded from physiological data analysis due to missing data (values not recorded).

Appendix K: Results Tables

Table K1

Summary of Means, Standard Deviations and Analysis of Variance for VAS Self-Criticism and Self-Compassion Pre and Post Prime (ANOVA)

State measure	**Attachment group (n=25)**		**Neutral group (n= 24)**		**Within subjects main effect of time**				**Between-subjects main effect of group (attachment vs neutral)**				**Group by time interaction**			
	PRE *M*(SD)	POST *M*(SD)	PRE *M*(SD)	POST *M*(SD)	Test Statistic (*F*)	*df*	*p*	ηp^2	Test Statistic (*F*)	*df*	*p*	ηp^2	Test Statistic (*F*)	*df*	*p*	ηp^2
Self-criticism	50.28 (27.9)	41.52 (26.4)	40.79 (28.98)	51.13 (21.32)	.041	1,47	.840	.001	<.001	1,47	.993	<.001	6.047	1,47	.018*	.114
Self-compassion	51.00 (20.24)	60.24 (20.99)	57.33 (17.29)	55.83 (16.26)	3.243	1,47	.078	.065	.038	1,47	.846	.001	6.243	1,47	.016*	.117

* significant at p < .05 ** significant at p < .01

Table K2

Summary of Means, Standard Deviations and Analysis of Variance for VAS Self-Criticism and Self-Compassion Pre and Post Meditation (ANOVA)

State measure	**Attachment group (n=25)**		**Neutral group (n= 24)**		**Within subjects main effect of time**				**Between-subjects main effect of group (attachment vs neutral)**				**Group by time interaction**			
	PRE *M*(SD)	POST *M*(SD)	PRE *M*(SD)	POST *M*(SD)	Test Statistic (*F*)	*df*	*p*	ηp^2	Test Statistic (*F*)	*df*	*p*	ηp^2	Test Statistic (*F*)	*df*	*p*	ηp^2
Self-criticism	41.52 (26.4)	44.16 (24.05)	51.13 (21.32)	33.96 (25.62)	5.977	1,47	.018*	.113	.002	1,47	.963	<.001	11.11	1,47	.002**	.191
Self-compassion	60.24 (20.99)	64.24 (21.64)	55.83 (16.26)	69.21 (20.13)	10.26	1,47	.002**	.179	.003	1,47	.955	<.001	2.987	1,47	.090	.060

Table K3

Summary of Means, Standard Deviations and Between and Within Group Differences Pre and Post Priming (Mann-Whitney U, Wilcoxon Signed Ranks Test)

State measure	**Attachment group (n=25)**		**Neutral group (n= 24)**		**Between-subjects group differences post-prime**				**Within-subjects (attachment group)**			**Within-subjects (neutral group)**		
	PRE *M*(SD) Median (Range)	POST *M*(SD) Median (Range)	PRE *M*(SD) Median (Range)	POST *M*(SD) Median (Range)	Test Statistic (*U*)	*Z*	*p*	*r*	*Z*	*p*	*r*	*Z*	*p*	*r*
Attachment security	61.80 (20.55) 61.00 (87.00)	77.12 (14.23) 75.00 (46.00)	69.58 (18.39) 69.00 (69.00)	71.88 (16.01) 74.50 (56.00)	253	-.931	.352	-.133	-4.120	**<.001*** **	-.824	-.837	.403	-.170
Attachment avoidance	44.04 (29.71) 35.00 (91.00)	33.24 (27.77) 29.00 (92.00)	37.46 (31.63) 24.50 (100.00)	35.92 (28.79) 23.50 (86.00)	285	-.300	.764	-.043	-3.20	**.001** **	-.64	-1.708	.088	-.35
Attachment anxiety	45.60 (29.24) 43.00 (97.00)	47.04 (29.59) 42.00 (100.00)	43.54 (31.70) 40.50 (97.00)	44.00 (31.98) 43.00 (98.00)	282	-.360	.719	-.05	-.259	.796	-.05	-.435	.664	-.088

** significant at p <.01 *** significant at p <.001

Table K4

Summary of Means, Standard Deviations and Between and Within Group Differences Pre and Post Meditation (Mann-Whitney U, Wilcoxon Signed Ranks)

State measure	**Attachment group (n=25)**		**Neutral group (n= 24)**		**Between-subjects group differences post-meditation**				**Within-subjects (attachment group)**			**Within-subjects (neutral group)**		
	PRE *M*(SD) Median (Range)	POST *M*(SD) Median (Range)	PRE *M*(SD) Median (Range)	POST *M*(SD) Median (Range)	Test Statistic (*U*)	*Z*	*p*	*r*	*Z*	*p*	*r*	*Z*	*p*	*r*
Attachment security	77.12 (14.23) 75.00 (46.00)	69.00 (22.72) 72.00 (91.00)	71.88 (16.01) 74.50 (56.00)	82.75 (17.77) 88.00 (67.00)	175	-2.49	**.013***	-.36	-1.973	**.048***	-.39	-2.973	**.003****	-.61
Attachment avoidance	33.24 (27.77) 29.00 (92.00)	36.68 (33.12) 33.00 (100.00)	35.92 (28.79) 23.50 (86.00)	24.00 (24.35) 19.00 (87.00)	235	-1.30	.193	-.18	-.715	.475	-.143	-2.906	**.004****	-.59
Attachment anxiety	47.04 (29.59) 42.00 (100.00)	43.16 (29.81) 42.00 (100.00)	44.00 (31.98) 43.00 (98.00)	44.83 (31.60) 53.50 (100.00)	285	-.290	.772	-.04	-2.227	**.026***	-.44	-.673	.501	-.13

* significant at p < .05 ** significant at p <.01

Table K5

Summary of Between-Group Heart Rate Variability Differences during Priming (Kruskal-Wallis Test)

Time point	Minute 1	Minute 2	Minute 3	Minute 4	Minute 5	Minute 6	Minute 7	Minute 8
χ^2 (1)	<.001	.132	.546	.225	1.722	2.151	.117	.514
p	.991	.716	.460	.635	.189	.143	.732	.474

Table K6

Summary of Between-Group Heart Rate Variability Differences during Meditation (Kruskal-Wallis Test)

Time point	Min 1	Min 2	Min 3	Min 4	Min 5	Min 6	Min 7	Min 8	Min 9	Min 10	Min 11	Min 12
χ^2 (1)	1.192	2.772	3.555	1.664	2.216	3.230	2.216	1.444	.395	1.290	.269	1.144
p	.275	.096	.059	.197	.137	.072	.137	.229	.530	.256	.604	.285

Table K7

Summary of Between-Group Heart Rate Differences during Priming (Kruskal-Wallis Test)

Time point	Minute 1	Minute 2	Minute 3	Minute 4	Minute 5	Minute 6	Minute 7	Minute 8
χ^2 (1)	.579	2.282	2.349	4.435	3.310	3.555	4.912	11.162
p	.447	.131	.125	.035*	.069	.059	.027*	.001**

* significant at p < .05 ** significant at p < .01

Table K8

Summary of Between-Group Heart Rate Differences during Meditation (Kruskal-Wallis Test)

Time point	Min 1	Min 2	Min 3	Min 4	Min 5	Min 6	Min 7	Min 8	Min 9	Min 10	Min 11	Min 12
χ^2 (1)	4.529	9.464	8.798	7.418	2.627	4.815	4.815	5.831	6.155	6.945	10.296	6.600
p	.033*	.002**	.003**	.006**	.105	.028*	.028*	.016*	.013*	.008**	.001**	.010*

* significant at p < .05 ** significant at p < .01

Table K9

Summary of Between-Group Skin Conductance Differences during Priming (Kruskal-Wallis Test)

Time point	Minute 1	Minute 2	Minute 3	Minute 4	Minute 5	Minute 6	Minute 7	Minute 8
χ^2 (1)	.117	.003	.001	.102	.269	.102	.579	1.290
p	.732	.956	.974	.749	.604	.749	.447	.256

Table K10

Summary of Between-Group Skin Conductance Differences during Meditation (Kruskal-Wallis Test)

Time point	Min 1	Min 2	Min 3	Min 4	Min 5	Min 6	Min 7	Min 8	Min 9	Min 10	Min 11	Min 12
χ^2 (1)	2.086	4.529	5.938	6.155	6.600	4.815	2.846	2.699	3.723	3.472	2.772	.648
p	.149	.033*	.015*	.013*	.010*	.028*	.092	.100	.054	.062	.096	.421

* significant at $p < .05$

Table K11 *Overall Summary of Results*

Variable	Prime	Implications for hypotheses	LKM	Implications for hypotheses
State self-criticism	Significant time by group interaction (reduction for attachment group, increase for neutral group), but no significant main effect of group or time.	Hypothesis 2 (a) not supported	Significant time by group interaction, significant main effect of time (significant reduction for neutral group). No group difference. No significant change over time for attachment group.	Contrary to Hypothesis 2 (b)
State self-compassion	No significant differences between groups, but a significant increase over time for attachment group, no change for neutral group.	In line with Hypothesis 2 (a)	No significant differences between groups. No significant change over time for secure group. Significant increase over time for neutral group.	Contrary to Hypothesis 2 (b)
State attachment security	No significant group differences. Attachment group significant increase over time, no significant change for neutral group.	In line with Hypothesis 2 (a)	Groups significantly different at time point three (higher security in neutral group). Significant decrease over time for attachment group, significant increase for neutral group.	Contrary to Hypothesis 2 (b)
State attachment avoidance	No significant differences between groups. Significant reduction in avoidance over time for attachment group, no significant effect in neutral.	In line with Hypothesis 2 (a)	No significant differences between groups. No significant change over time for attachment group. Significant reduction for neutral group.	Contrary to Hypothesis 2 (b)
State attachment anxiety	No significant differences between groups. No significant change over time for either group.	Hypothesis 2 (a) not supported	No significant differences between groups. No significant change over time for neutral group, significant reduction in attachment group.	In line with Hypothesis 2 (b)
Heart Rate Variability (HRV)	HRV mostly close to baseline (zero). No effects found for group or time (except higher HRV in attachment group than in neutral group just prior to meditation).	Hypothesis 3 (a) not supported	HRV close to baseline (zero). No significant overall effects of time or group.	Hypothesis 3 (b) not confirmed.
Heart Rate (HR)	HR elevated from baseline (zero) in both groups. Significant difference between groups at some time points with heart rate lower in secure group. Significant decrease over time in attachment group, significant increase over time in neutral group.	Partial support for Hypothesis 3 (a)	HR below baseline (zero) in both groups except minutes 10-12 for secure group. Significant differences between groups in all time points except one, in reverse of expected direction (lower heart rate in neutral group). Significant increase in heart rate over time for both groups.	Contrary to Hypothesis 3 (b)
Skin Conductance Level (SCL)	HR elevated from baseline (zero) in both groups. No significant difference between groups. Significant decrease in SCL over time in both groups.	Hypothesis 3 (a) not supported	SCL initially elevated from baseline (zero), below baseline in both from minute 4. Significant differences between groups for almost half the time points in expected direction (SCL lower in secure group). Significant overall decrease in SCL over time for both groups.	Partially in line with Hypothesis 3 (b)

Appendix L: Dissemination Statement

The target journal for this research is Emotion. The paper will be adapted to the relevant style and sent for peer review. A summary of the findings will be shared with other doctoral students at a presentation in June 2015, and will be sent to all participants who expressed an interest in being informed of the results. The thesis will be made universally accessible through Open Research Exeter (ORE), the online institutional repository.